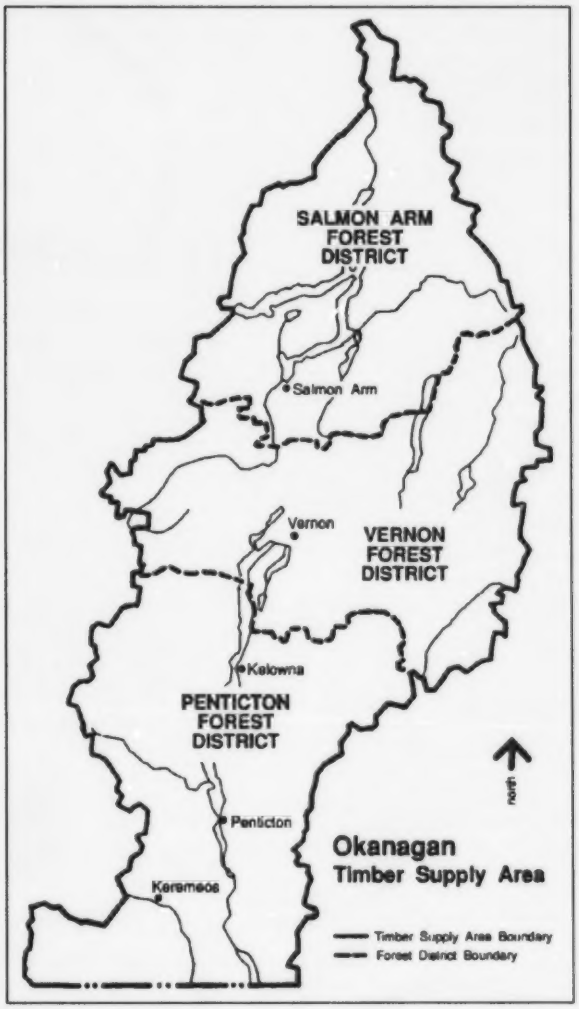
RESOURCE MANAGEMENT

Okanagan Timber Supply Area Resource Management Plan 1992 - 1996



March, 1992

Province of British Columbia
Ministry of Forests

Okanagan
Timber Supply Area
Resource Management Plan
1992 - 1996

March, 1992

Okanagan
Timber Supply Area

Timber Supply Area boundary
Forest District boundary

KEY MAP

SALMON ARM FOREST DISTRICT

Sicamous

Salmon Arm

Vernon

VERNON FOREST DISTRICT

Kelowna

PENTICTON FOREST DISTRICT

Penticton

Keremeos

NORTH

92-03464/

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Glossary

1 Introduction

The Okanagan Timber Supply Area (TSA) Resource Management Plan has been prepared by Forest Service District and Regional staff. The document outlines production levels for timber, range and recreation for the five-year period from January 1, 1992, to December 31, 1996. The Forest Service has the direct legal mandate for timber, range and recreation, but it also manages water, fisheries, wildlife habitat and soil with other ministries and considers land use issues such as agriculture, parks and access right-of-ways for power lines, roads, and mining.

This management plan is part of the "integrated resource management" planning process that started with forest inventories. Since then much information on natural resources in the area has been collected. Many public meetings have been held and the Options Report was discussed and reviewed by the public in the spring and fall of 1990. The purpose of that document was to describe the TSA's natural resources and management issues and options so that the public could respond to them and so assist the Chief Forester in meeting his responsibility under the Forest Act.

In August 1991, the Chief Forester made his determination, guided by the Options Report, public input, industry needs and government agency management concerns:

1. **Allowable Annual Cut**
   The AAC will be reduced to 2,615,000 m^3 from 2,700,000 effective January 1, 1992. This includes 50,000 m^3 per year to account for a policy change for the utilization of stands of decadent cedar and hemlock species. Because of the mountain pine beetle epidemic, there is a temporary AAC uplift of 200,000 m^3 from January 1990 to December 1992.

2. **Range**
   The current level of range use 97,063 AUMs will be maintained. To achieve this target on a sustainable basis, an increase in the level of management for range is required as well.

3. **Recreation**
   The objective of the recreation program will be to meet the current demand for forest-oriented recreational use and aesthetic quality. An increased level of management is required to achieve this objective.

In response to concerns from the public, resource users, resource managers and special interest groups, a set of interim Timber Harvesting Guidelines was implemented in 1989. These guidelines were revised in 1990/91 and reviewed by the public in April 1991. The

public has also expressed concerns over management objectives during various Local Resource Use Planning processes and at various planning meetings, including those conducted under the Parks and Wilderness for the 90's initiative. All this background information has been brought together into this five-year resource management plan which defines how the Forest Service will manage forests for timber production, for wildlife and cattle forage, and for public recreation.

The plan is organized into seven chapters:

Summary - The contents of the Plan

1 **Introduction** - How the management plan was prepared and its content.

2 **Agencies Involved in Resource Management** - Various ministries and agencies involved in resource management and some of the planning processes that are incorporated into this plan.

3 **Okanagan TSA: - Resources and Regional Economy** - Natural resources, human populations and regional economy of the Okanagan Timber Supply Area.

4 **Okanagan TSA Resource Management Planning Process** - The planning process involved in developing this resource management plan.

5 **Resource Management Options** - The options for managing resources in the TSA as outlined in the Options Report.

6 **Chief Forester's Determination** - The Chief Forester's determination for timber, range and recreation management levels.

7 **Resource Management Strategies** - Management strategies for the timber, silviculture, recreation and range programs.

8 **Implementation** - The mechanisms to implement the plan: Timber Harvesting Guidelines, Program Management Plans and Local Resource Use Plans.

The plan is for the five-year period, 1992 to 1996, but will be revised and updated as conditions change in the TSA.

2 Agencies Involved in Resource Management

Forest resource planning is a very complex process involving many government agencies, resource users and the public. The Forest Service uses "integrated resource management" (IRM) as a process of natural resource management, in which all resource values, environmental concerns and resource users are considered. Integrated resource management involves the public in the planning process. Section 4 discusses in more detail the planning process used in the development of this management plan.

The following sections describe the government agencies involved in resource management.

2.1 Ministry of Forests

The Ministry of Forests (also referred to as the Forest Service) is the arm of the provincial government that administers the Ministry of Forests Act, the Forest Act and the Range Act.

2.1.1 Ministry of Forests Administration

The Ministry of Forests has three administrative levels: headquarters in Victoria; 6 regions Prince Rupert, Vancouver, Prince George, Cariboo, Nelson and Kamloops; and 43 districts. The Salmon Arm, Vernon, Penticton, Lillooet, Kamloops, Clearwater and Merritt districts are in the Kamloops Region. For planning purposes, the province is divided into 35 "Timber Supply Areas" and the Districts of Salmon Arm, Vernon and Penticton are in the Okanagan TSA (see the key map).

Headquarters

The deputy minister and ministry staff based in Victoria advise the minister and provincial Cabinet on all matters relating to forest and range policy-making. This headquarters group also supports and guides the work of the regions and districts throughout the province. It is divided into four divisions headed by an assistant deputy minister. These four officials, together with the deputy minister as chairman, constitute the Ministry's executive. There are nineteen branches reporting to members of the executive.

Kamloops Region

The regional office is organized by functions, similar to the way that the ministry headquarters is organized.

Regional managers and their staff develop regional programs and procedures from broad provincial policies. Then they pass the programs and procedures on to the districts, and supply professional and technical expertise to help implement the programs. The regional

offices audit and monitor the performance of districts, and co-ordinate all regional field operations.

Districts

There are three forest districts in the Okanagan TSA:

Penticton

Vernon

Salmon Arm

The district manager and staff are responsible for the field work involved in administering and managing forest and range regulations and licence agreements, and in protecting forest and range lands against fire and disease.

As a front-line operation, the district office is the best place for the public to go for help or information about ministry programs and local forestry or range matters. For instance, staff can explain harvesting and development plans, describe forest recreation sites and trails in the district, and provide information about cattle grazing on Crown land. They can also offer advice about using logging roads, cutting firewood, and preventing forest fires.

As well, district offices issue licences and permits for forest land use activities including logging, grazing, road use, salvage logging and Christmas tree harvesting. They receive applications for registration under the Small Business Forest Enterprise Program and for various other licences and permits.

2.1.2 The Ministry of Forests Act, the Forest Act and the Range Act

The Ministry of Forests administers the Forest Act and the Range Act. The Forest Act states that the Chief Forester will assess the land in the province for its potential to:

- grow trees continuously;
- provide forest or wilderness-oriented recreation;
- produce forage for livestock and wildlife;
- conserve wilderness; and
- accommodate other forest uses.

The Forest Act further states that the Chief Forester will classify areas as forest land if it will provide the greatest contribution to the social and economic welfare of the province maintained predominantly in successive crops of trees or forage, or as wilderness.

Section 5.1 of the Act states government may designate a wilderness area. Once designated, the area may not be logged but may be used for:

- the preservation of wilderness
- any use consistent with the preservation of wilderness
- other permitted uses.

Section 7 of the Act states that the Chief Forester will determine an Allowable Annual Cut in each TSA of the province. Section 104 of the Act states that the Chief Forester can designate Crown land for forest recreation and trails. The Range Act says that the Ministry of Forests can issue grazing and hay cutting licences and permits on Crown lands.

Through legislation, the Ministry of Forests is responsible for managing the forests of British Columbia for the production of timber, for the production of forage for cattle and wildlife, and for recreation. Because many other natural resources affected are a part of forests, the Ministry takes these into account when it plans for timber harvesting, forage production and recreation. Other important values are water, fisheries, wildlife habitat and soil. Other land uses include agriculture, access right-of-ways for power lines, roads and mining access. It is a very complex planning process. Much information is needed and the Ministry recognizes all forest values and uses in its integrated resource management planning process.

The Okanagan TSA Options Report leading to this resource management plan was a planning document and part of the Ministry's integrated resource planning process. The Options Report helped the Chief Forester perform his responsibilities defined in the Forest Act for the Okanagan TSA, to:

- set an Allowable Annual Cut for the harvest of timber in the Okanagan TSA;
- set an objective for range management that will allow the Ministry to license Crown lands to produce cattle forage for the ranching industry;
- set objectives for the management of forests for public and commercial recreation.

2.1.3 Ministry of Forests Planning

Timber Supply Areas (TSAs)

Timber Supply Areas are geographic units established by the Ministry of Forests under the authority of Section 6 of the Forest Act for the planning and management of forest resources within its boundaries. The boundaries take into account transportation networks and the location of manufacturing facilities. The TSA includes areas of public

forest land that are managed by both the Forest Service and forest licence holders. The TSA resource management plan sets timber, range and recreation management objectives for the public lands outside the Tree Farm Licences (TFLs). Management objectives for the TFLs are set separately within the TFL planning process.

To manage for timber, range and recreation the Ministry of Forests has divided the province into 35 TSAs.

Local Resource Use Plans (LRUPs)

Local Resource Use Plans (LRUPs) establish integrated resource management guidelines for areas where resource use development is proposed and conflicts may exist. These areas usually require management guidelines over and above those stipulated in the Okanagan TSA Timber Harvesting Guidelines, or address issues not currently addressed under the guidelines.

2.1.4 Integrated Resource Management Timber Harvesting Guidelines

The guidelines provide an overall framework for integrated resource management decision-making as it affects timber harvesting in the Okanagan TSA. The focus is on timber management because this activity can have a major impact on fish, wildlife, soils, water, range and recreation. The guidelines, containing recommended management practices that recognize the significance of other natural resource values, integrate these practices into the process of timber harvesting.

The guidelines are designed to be used concurrently with present policies and legislation administered by the Forest Service, Department of Fisheries and Oceans, and the Ministry of Environment, Lands and Parks. They are not regulations, and they may or may not be defined in law, but they do outline what is expected to be done. The guidelines are considered to be dynamic and will be revised as the public's values change, as demands on the environment change, and as new forest management practices evolve. As such, they can be a very effective tool in resource management, since guidelines are often easier to change than laws and regulations.

Timber Harvesting Guidelines Process

During the process of developing the first set of Timber Harvesting Guidelines, the public, forest companies and other government agencies involved in resource management were consulted. A similar process was followed when the guidelines were reviewed and revised in 1990/91. The implementation of the harvesting guidelines has had a beneficial impact on how natural resources in the TSA are managed and these are therefore an important aspect of this management plan.

For a summary of the guidelines, refer to section 8.1 of this report. Complete guidelines and maps can be obtained from Forest Service District offices.

2.2 Other Government Agencies

The Ministry of Forests is not the only government agency involved in managing natural resources in the Okanagan. The following provincial, federal and local governments are involved:

2.2.1 Provincial

Ministry of Environment, Lands and Parks

The three main sections of B.C. Environment involved in natural resource management are Fisheries, Wildlife and Water Management. The Fish and Wildlife Branch works with the Forest Service to suggest ways to manage forests that minimize the negative impact on fish and wildlife. Additionally, the Pesticide Control Branch authorizes the use of chemicals for pesticide and herbicide control and the Conservation Branch administers the Ministry's acts and legislation. The Water Licensing Section issues water licences for a variety of uses that affect watershed management, and works with the Forest Service on related issues. B.C. Environment has offices in Kamloops and Penticton.

The Parks Branch is responsible under the Park Act for the designation, management and conservation of a land and water-based system of parks, recreation areas and ecological reserves that contain the best representative elements of the province's natural and cultural heritage. It manages all of the resources within park boundaries both to protect the natural environment and to provide recreation opportunities.

The mission statement of the Crown Lands Branch is:

> Serving the people of British Columbia by managing and allocating public lands and ensuring access for industrial, commercial, settlement, recreation and conservation in a manner that is sensitive to environmental needs.

There are three classifications for parks:

Class A Parks (Provincial Parks)

The majority of parks are Class A, in which commercial timber resource harvesting is not permitted.

Recreation Areas

These areas are park reserves under evaluation for mineral resources and may become Class A parks after the evaluation. While these lands

are under strict control, some commercial logging may be allowed. In 1988/89, 22 recreation areas were upgraded to park status.

Class C Parks

These are community parks and make up a small percentage of the parks system. They are gradually being turned over to municipal and regional governments for administration, in keeping with the Ministry's goal to have all major lands within the system designated as Class A Parks.

In addition to overseeing parks, the Parks Branch manages the Ecological Reserve system. These areas are set aside to preserve samples of representative, rare or endangered ecosystems. They offer long-term research and educational opportunities, as well as casual, non-consumptive public uses, such as nature photography and bird watching.

Ministry of Agriculture, Fisheries and Food

This ministry is responsible for industries involved in producing, processing, distributing and marketing agricultural, fish and food products in the province.

Ministry of Transportation and Highways

This ministry is responsible for the transportation systems in the province, of which highways is the largest. Apart from the reduction of the forest land base caused by road building, and changes in recreation patterns due to new roads or road upgrading, the major effect of highways on the Ministry of Forests' responsibilities is in visual resource management. Highway engineers try to minimize the negative impact of roads on the landscape, while the Ministry of Forests is usually responsible for the adjacent visual corridor.

The Ministry of Highways deals directly with the Ministry of Forests on issues of land clearing, right-of-way maintenance, access, and gravel pit rehabilitation. Most co-ordination is done at the regional level.

Ministry of Energy, Mines and Petroleum Resources

This ministry is responsible for managing the province's energy and mineral resources so as to obtain the best value for the people of British Columbia. It is the Ministry's responsibility to:

- put policies in place that promote the effective management of energy and mineral resources, consistent with and responsive to the government's overall economic goals;
- collect a fair share of resource revenue for the province; and
- ensure that the operations involved are safe, efficient and environmentally sound.

There are two divisions within the Ministry that are directly involved in resource planning: the Energy Resources Division and the Mineral Resources Division. These two divisions oversee the operations of the province's industries in the mining and energy fields.

This ministry works with the Ministry of Forests by ensuring the reclamation of land disturbed by mining, through such activities as revegetation or reforestation, as reseeding, resloping and fertilizing. The Transportation Ministry often stipulates conditions to protect forest resources as part of the provincial approval of energy products. Conversely, it participates in several Ministry of Forests procedures including pulpwood agreements and wilderness designation proposals.

2.2.2 Federal

Fisheries and Oceans Canada

The Department of Fisheries and Oceans (DFO) is responsible for the protection and management of fish and fish habitat under the Fisheries Act of Canada. In British Columbia, DFO is primarily concerned with the management of salmon and marine species. Fishery Officers and Habitat Management staff review forest harvesting plans, provide advice to the Ministry of Forests and industry, and monitor logging operations to ensure that water quality and fish habitat are preserved.

Environment Canada

This federal department is divided into three sections: Parks Canada, Conservation and Protection, and the Atmospheric Environment Service. Parks Canada oversees the federal parks system. Conservation and Protection is divided into three branches: Environmental Protection, Inland Waters Directorate, and the Canadian Wildlife Service.

Environmental Protection is responsible for enforcing the Canadian Environmental Protection Act and that section of the Fisheries Act dealing with industrial pollution. This agency, in co-operation with other agencies, protects the environment by identifying environmental problems, and then developing and carrying out protection and control measures.

The Inland Waters Directorate, in co-operation with provincial agencies, is responsible for water quality monitoring, groundwater resource management, and water planning and management. The Okanagan Basin Implementation Program has improved flood control and water quality and provided a plan for water management in the Okanagan Valley.

The role of the Canadian Wildlife Service is to protect and manage Canada's migratory birds, to provide leadership in wildlife

management, and to co-operate with other agencies and organizations in maintaining the productivity of wildlife habitat.

2.2.3 Regional Districts

The following six regional districts are within the Okanagan TSA:

Columbia-Shuswap
North Okanagan
Central Okanagan
Okanagan-Similkameen
Kootenay Boundary (small area)
Thompson-Nicola (small area)

Regional Districts have the authority to plan for land uses of areas outside municipalities and provincial forests, as defined in the Municipal Act.

2.2.4 Municipalities

Municipalities have the authority to plan land uses and levy taxes within defined population boundaries. The largest municipalities in the TSA are authority over the management of natural resources, municipal growth affects water recreation, forest, range and wildlife. People within the municipalities are the major users of the natural resources within the TSA and most people who work in natural resource industries live in the municipalities.

2.3 Public Interest Groups

There has been an increased awareness of environmental issues such as the greenhouse effect, ozone depletion, aesthetic pollution and pollution in general. This has increased the demand for changes in how our natural resources are managed and used. Local resource use planning committees have been formed and have representatives from many public interest groups.

3 Okanagan TSA : Resources and Regional Economy

3.1 Area Description

The Okanagan TSA is one of the largest and most complex TSAs in the Province. Approximately 320 km long and 140 km wide, it stretches from the watershed of the Seymour River that flows into Shuswap Lake, south to the Canada/U.S. border; and from the Monashee Mountains in the east to the Okanagan Range in the west. There is a diversity of climates and associated vegetation, from the wet interior hemlock and cedar forests in the north, to the semi-arid sage brush grasslands of the south.

As at the 1986 census, the area supported a population of 223,371. Along with the Lower Mainland and southern Vancouver Island the Okanagan is one of the fastest growing areas in the province. It supports some of the largest population centres in the interior of the province. This places special demands on the area's resources, including the high quality water supplies. There is also a growing demand for various types of outdoor recreational experiences, for area residents and those travelling into the area.

The area has a diversified economy in that it is not reliant on one economic activity. The main industries are tourism, agriculture, forestry, manufacturing and service to a large retired population in the Central Okanagan. Tourism and recreation are especially important and this has a major impact on the management of forest resources. The forest industry supports approximately 10,000 direct and indirect jobs, or about 10 % of the work force in the TSA. Forestry accounts for approximately 25% of the economic activity in the northern Shuswap portion of the TSA.

The Okanagan TSA contains important wildlife and fisheries resources and supports the greatest diversity of wildlife in the province. Habitats range from the desert near Osoyoos to glaciers near Revelstoke and each habitat supports its own variety of wildlife.

3.1.1 Climate

The climate of the TSA is affected by the rainshadow created by the Coastal Mountains. As warm, moist maritime air masses move in from the coast, they are forced to rise over the mountains, dropping much of their moisture on the coastal regions. This creates the hot, dry climate of the Okanagan Valley. The northern portion of the TSA, around Shuswap Lake, is in the foothills of the Rocky Mountains, where the air again begins to rise, rainfall is heavier, and temperatures are more moderate than in the south.

3.1.2 Biogeoclimatic Zones

Seven climatically distinct areas are found in the TSA:

Bunchgrass

The Okanagan Valley bottom from Summerland to the border and west to Keremeos is in the Bunchgrass zone. This area is natural grassland and sage, with occasional ponderosa pine and Douglas-fir, although the dry climate restricts their growth. The region supports critical winter and spring forage for bighorn sheep and white-tailed deer and is the home of the burrowing owl. This zone also provides critical spring livestock range and, with irrigation, has produced some of the province's most valuable agricultural land.

Ponderosa Pine

The Ponderosa Pine zone borders the Bunchgrass zone on the slopes of the Okanagan Valley and extends up the valley to north of Kelowna. This is the warmest and driest of the province's forest zones. Ponderosa pine is the dominant tree, with open grasslands on the drier sites and Douglas-fir on the colder and wetter sites. Like the Bunchgrass zone, this zone provides important range forage and, with irrigation, is valuable agriculturally.

Interior Douglas-fir

At still higher elevations and stretching north to Shuswap Lake is the Interior Douglas-fir zone. Douglas-fir is the dominant tree species, mixed with lodgepole pine at higher elevations and ponderosa pine and open grasslands at lower elevations. Pinegrass, bunchgrasses and shrubs dominate the understory, providing important spring and fall forage for livestock and winter forage for wildlife.

Montane Spruce

Surrounding the subalpine mountain tops and on the higher plateau areas is the Montane Spruce zone. Engelmann and hybrid spruce and varying amounts of subalpine fir are the characteristic tree species, with lodgepole pine, Douglas-fir and trembling aspen also occurring. This zone provides important summer range.

Engelmann Spruce - Subalpine Fir

This zone occurs at the higher elevations in the TSA. Only those plants capable of tolerating extended periods of frozen ground occur, with Engelmann spruce, subalpine fir and lodgepole pine being the dominant tree species.

Interior Cedar - Hemlock

This zone occurs in the northern portion of the TSA around Shuswap Lake, and in the south in the Monashee Park/Sugar Lake area. The area is much wetter than the others, with warmer winters and cooler summers than in the south. This zone is the most productive for growing trees and has the widest variety of species. Western hemlock and western redcedar are characteristic, but spruce and subalpine fir are common. Douglas-fir and lodgepole pine are generally found on drier sites. This zone is important for growing trees and providing range after logging.

Alpine Tundra

This zone occurs at the highest elevations. It is made up of treeless areas with covers of grass, flowers and shrubs. This zone is important summer range for wildlife, and has high recreation value.

3.2 Population and Communities

The TSA contains all of the Central Okanagan and North Okanagan and most of the Okanagan-Similkameen Regional Districts. There is also a small part of the Columbia-Shuswap and the Thompson-Nicola and Grand Forks-Greenwood Regional Districts. The statistics presented in this section are for areas that most closely follow the TSA boundaries.

Table 1 shows the populations in each Regional District and what percentage of the total TSA population each accounts for. It does not include the small portions of the Thompson-Nicola and Grand Forks-Greenwood Regional Districts.

Table 1
Population Summary by Regional District
(1986 Census)

Regional District	Population	% of TSA
Columbia Shuswap		
Salmon Arm	11,200	
Falkland	3,260	
Sorrento	4,160	
Sicamous	3,750	
Rural	2,066	
Total	**24,436**	**10.7**
North Okanagan		
Armstrong	2,706	
Enderby	1,849	
Vernon	20,400	
Lumby	1,181	
Rural	28,684	
Total	**54,820**	**24.1**
Central Okanagan		
Kelowna	61,213	
Peachland	2,988	
Lakeview Heights	6,115	
Westbank	10,237	
Rural	13,299	
Total	**93,852**	**41.3**
Okanagan-Similkameen		
Penticton/Summerland	33,600	
Osoyoos	2,956	
Keremeos	839	
Oliver	3,230	
Okanagan Falls	1,470	
Kaleden	1,004	
Rural	11,286	
Total	**54,385**	**23.9**
Total All	**227,493**	**100.0**

The highest concentration of people is in the Central Okanagan, centred around urban Kelowna and the outlying communities of Westbank and Lakeview Heights (Table 2). Population projections done by the Central Statistics Bureau of the Ministry of Finance predict

an increase of 80% in the next 20 years, from 90,000 in 1986 to 150,000 in 2011.

The Penticton/Peachland area experienced one of the fastest growing rates in the province during the 1980s and this growth is expected to continue. The North Okanagan also has a large urban population around Vernon and outlying areas, with a projected 2% increase per year over the next 20 years. Similarly, Salmon Arm is growing at a rate of approximately 2% per year and will continue to grow as transportation links improve.

The increase in population in many of these areas is from retirees coming from other parts of the province or the prairies. This trend will result in an aging of the population at a rate faster than the provincial average, which may increase the demand for health services and recreation facilities.

Table 2
Population Trends, 1981-1986

Area	Percent Change
Oliver	+ 3.3%
Penticton/Summerland	+ 3.9%
Peachland	+ 7.5%
Kelowna	+ 4.7%
Vernon	+ 1.5%
Spallumcheen	+ 0.4%
Salmon Arm	+ 2.4%
Keremeos	- 1.5%
Osoyoos	+ 4.0%
Okanagan Falls	+ 1.4%

Table 3 identifies the seven Indian Bands located in the TSA. As a result of Bill C31, which allowed Indian women to regain their Indian status, the population of Indian people on reserves increased substantially during the late 1980s. The Indian people of the Okanagan are of the Shuswap and Okanagan Tribes, which are part of the Interior Salish group of aboriginal peoples.

Table 3
Native Population on Reserves, 1983

Band	Number of Reserves	Population[1]
Lower Similkameen	9	224
Osoyoos	2	176
Okanagan	5	871
Penticton	2	391
Westbank	3	226
Spallumcheen	3	337
Little Shuswap Lake	5	193
Total	29	2,418

[1]Data from Indian and Northern Affairs Canada.

Table 4 shows the labour force in the TSA in 1986.

Table 4
Labour Force, 1986

Sector	Persons[1]	%
Agriculture	8,200	8.4
Fishing and trapping	95	0.1
Logging and forestry	2,720	2.8
Mining (including milling), quarrying	1,120	1.1
Manufacturing (including sawmilling, etc)	12,255	12.5
Construction	5,885	6.0
Transportation and storage (includes lumber)	3,120	3.2
Communication and utilities	2,800	2.9
Wholesale trade	3,460	3.5
Retail trade	15,485	15.8
Finance and insurance	2,815	2.9
Real estate operators and insurance agents	2,060	2.1
Business service	3,145	3.2
Government service	4,415	4.5
Educational service	5,015	5.1
Health and social service	8,550	8.7
Accommodation, food and beverage service	9,355	9.4
Other service industries (includes to forest ind.)	7,635	7.8
Total	**98,130**	**100.0**

[1]Data from Statistics Canada

3.3 Agriculture

Agriculture is an important part of the economy, supporting a workforce of approximately 8,200 or 8.4% of the total labour force. Vineyards, orchards and cattle are a traditional part of the region's image. Intensive agriculture takes place in the valleys of the Okanagan, Similkameen, Shuswap and Salmon rivers. In the South-Central Okanagan 96%, of British Columbia's soft fruits and grapes are grown, replaced by hardier tree fruits such as apples further north. Fruit processing companies and wineries are concentrated in this area. The South-Central Okanagan, particularly around Keremeos and Oliver, has important forage production operations.

In the North Okanagan and Shuswap areas, livestock operations, dairy production and forage crops are the prevalent types of agriculture. These operations are discussed in the range and ranching section below.

Table 5 shows the hectares planted in each crop.

Table 5
Area in Various Crops, 1985

	Penticton		Kelowna		Spallum-	Salmon
	Oliver	Peachland[1]		Vernon	cheen	Arm[2]
Hay	3,139	903	205	1,701	5,191	7513	5,901
Feed grains	280	183	0	143	844	950	473
Feed corn	0	0	0	0	667	1,180	0
Grains	0	0	0	0	0	21,556	0
Orchards	3,270	1,931	370	3,929	509	38	**
Grapes	686	173	*	368	*	*	0
Other fruits	6	0	125	15	41	10	**
Vegetables	157	0	8	91	94	222	31
Other	533	233	78	623	694	377	1,498
Total	**8,071**	**3,423**	**786**	**6,870**	**8,041**	**12,445**	**7,903**

[1] *Included in fruits

[2] **Statistics not available - included in "Other"

3.4 Tourism/Recreation

Development of tourism got its real start when the Hope - Princeton Highway was opened in 1949, making the Okanagan a favourite destination for Lower Mainland residents. Improvements to the existing highway network provided further stimulus, and completion of the Rogers Pass section of the Trans-Canada Highway in 1962

greatly increased the flow of visitors from the prairies. Further expansion has been realized with the completion of Phase 3 of the Coquihalla Highway.

In addition to established commercial operations such as hotels, motels and campgrounds, new enterprises such as house boat vacations, ski hill expansions and heli-skiing are diversifying and expanding tourism into a year-round industry. While the Okanagan/Shuswap area is known for its large lakes and sandy beaches, recent trends indicate a growing desire for more diversified recreation opportunities. Hiking, fishing, wildlife viewing and wilderness experience are becoming more important. This suggests a trend towards greater demand for public and commercial backcountry recreation opportunities and services.

Most of the TSA, with its numerous lakes and warm, dry climate, is a popular tourist destination as well as an important stop-over point for travellers. Apart from the scenery and climate, the area offers excellent boating and beautiful public beaches on Shuswap, Skaha and Okanagan lakes, as well as numerous smaller lakes. There is good fishing for rainbow trout, eastern brook trout, Dolly Varden and kokanee, plus opportunities for hunting and wildlife viewing. The latter has been recognized as a significant new dimension to the tourism industry and is being actively marketed.

Development of many ski hills in the Okanagan during the latter part of the 1960s has been a benefit in reducing the extreme seasonality (high summer and low winter use) of the tourist industry. This seasonality has also been reduced to some extent by the significant number of prairie residents wintering in the area. The Okanagan/Shuswap has a growing national reputation as a desirable retirement area. Furthermore, many professionals and others with discretionary leisure time and income are drawn by the quality of life and outdoor recreation amenities. This is raising expectations and demands for year-round private and public facilities. Such a trend promises to strengthen the small business support and service economy.

Other attractions include the fish hatchery and agricultural research station at Summerland and the Okanagan game farm. Historic O'Keefe Ranch near Vernon is another popular attraction. The industry has actively promoted off-season attractions to reduce seasonality, with the result that Penticton and Kelowna have become two of the leading convention centres in the province.

The area has a number of excellent parks (Table 6).

Table 6
Parks in the TSA

Name	Access	Camping
Antlers Beach	Paved road	No
Apex Mountain Recreation Area	Gravel	No
Bear Creek	Paved	Yes
Cathedral	Gravel	Yes
Christie Memorial	Paved	No
Cinnemousun Narrows	None	Yes
Darke Lake	Gravel	Yes
Echo Lake	Gravel	No
Ellison Lake	Paved	Yes
Eneas Lake	4WD, trucks	No
Haynes Point	Paved	Yes
Herald	Paved	Yes
Inkaneep	Paved	Yes
Kalamalka Lake	Paved	No
Keremeos Columns	None	No
Kickininee	Paved	No
Mabel Lake	Gravel	Yes
Mara	Paved	No
Monashee	Walk-in	
Nickel Plate	4WD, trucks	No
Okanagan Falls	Paved	Yes
Okanagan Lake	Paved	Yes
Okanagan Mountain	None	Yes
Pennask Lake Rec. Area	4WD, trucks	No
Shuswap Lake	Paved	Yes
Shuswap Lake Marine Parks (11)	None	Yes
Silver Beach	Gravel	Yes
Silver Star	Gravel	No
Sun-oka Beach	Paved	No
Sunnybrae Rec. Area	Paved	No
T. Dagnus Locheed	Paved	No
Vaseux Lake	Paved	Yes
Yard Creek	Paved	Yes

A wide variety of recreation opportunities are available to residents and visitors in the Okanagan TSA because of the area's unique climate and topography. Activities representative of the urban, rural and roaded resource land categories of the Recreation Opportunity Spectrum (ROS) are abundant. In this TSA, lands providing for semi-primitive and primitive recreation use (wilderness) are limited to relatively few locations, primarily in the southwest and in the

northeast boundary areas. Of the remaining wilderness, four areas (representing 0.6% of the TSA) have been protected for future use.

Table 7 summarizes the remaining unroaded areas and those projected to remain unroaded by the eight ecosections that occur in the TSA. There are very few remaining unroaded areas in four ecosections: the Okanagan Basin and Highland, and the East and South Thompson Uplands. For these ecosections, virtually all the remaining unroaded lands outside of designated protected areas contribute to the AAC and are therefore scheduled to be roaded. Approximately 1% of these four ecosections have designated protected areas. The provincial average is 6.3%.

For the Okanagan TSA as a whole, 15% is unroaded, and 4% is projected to remain unroaded if areas that contribute to the AAC are developed. Less than 1% (0.6%) of the TSA is formally designated as park or wilderness.

Table 7
Wilderness in the TSA by Ecosection

Ecosection	Percent Ecosection in TSA[1]	Percent Unroaded[2]	% Projected to Remain Unroaded[3]	Park/ Wilderness[4]
Okanagan Basin	100	1	0	2
Okanagan Highland	90	4	0	2
E. Thompson Upland	60	2	0	0
S. Thompson Upland	25	5	1	0
Okanagan Range	60	24	5	18
Shuswap Highlands	60	14	2	8
N. Columbia Mountains	25	56	30	16
S. Columbia Mountains	10	16	8	1
Total, TSA	-	**15**	**4**	**0.6**
Total, B.C.	-	**56**	**24**	**6.3**

[1]Estimate only.

[2]As of March 1988; includes primitive and semi-primitive non-motorized and motorized Recreation Opportunity Spectrum classes.

[3]Unroaded areas that do not contribute to AAC and therefore are projected to remain unroaded.

[4]Formally designated National and Provincial Parks, recreation areas, and wilderness areas.

3.5 Range and Livestock

In the southern portion of the TSA, beef cattle are ranged on land not suited to cultivation, including grasslands and range land under forest cover. Dairy farming was more important in the past but most properties have been converted to more intensive agriculture or housing.

In the northern part of the TSA, rainfall is heavier and dairy farming is more important than ranching, although beef cattle are an important source of income, with lesser amounts contributed by poultry, pigs and sheep.

Range carrying capacity (which indicates the number of animals that an area can support) and licences are assessed in Animal Unit Months (AUMs). One cow, with or without calf, one bull or one yearling (one AUM), requires an average of 330 kg of forage per month. The number of hectares required to support one cow for the average five month grazing season varies from 3.5 to over 35 ha of useable forage, depending on forage quality and production.

Each type of forest or non-forest area has a different carrying capacity for cattle according to whether it is undisturbed, selection logged, and so on. Table 8 shows estimated areas of the various types of forest and non-forest cover in the TSA and a range of forage production.

Table 8
Areas Suitable for Range

Type	Total Area in TSA (ha)	Forage Production (kg/ha)
Grasslands	25,000	100-300
Wetlands (swamps)	11,000	300-600
Alpine	180,000	100-150
Ponderosa pine forest	30,000	30-150
Dry forests	440,000	100-150
Lodgepole pine forest	270,000	50-80
Wet forests	580,000	50-150
Deciduous forest	33,000	50-100
Clearcuts/wildfires	200,000	50-1,000

Table 9 shows the same forest cover types and their accessibility, species of forage and season of use.

Table 9
Accessibility and Season of Use

Type	Accessibility (%)	Major Forage Species	Season of Use
Grasslands	20-100	Blue bunch wheatgrass	Sp, F
Wetlands (swamps)	0-100	Sedges	Su, F
Alpine	0-100	Mix of flowers, grasses	Su
Ponderosa pine forest	30-70	Blue bunch wheatgrass	Sp, F
Dry forests	10-80	Pine grass	Su
Lodgepole pine forest	10-60	Pine grass	Su
Wet forests	0-20	Mix of flowers, grasses	Su
Deciduous forest	0-100	Blue grass	Sp, Su, F
Clearcuts	0-100	Pine/Orchard grass, clovers	Sp, Su, F

3.6 Timber Resources

3.6.1 The Forest Land Base

Table 10 shows a breakdown of the 2,206,892 ha of the TSA. The total productive forest land (1,403,647 ha) is all land minus areas such as rock, alpine and swamps that cannot support forests. To determine the net forest land base that is managed for timber production (988,194 ha) all areas that are forests but cannot be managed for timber harvest are subtracted from the total productive forest land (See Table 10). This includes NSR (not sufficiently restocked; i.e., logged, burned or subject to other natural destruction, but not reforested), ESA (environmentally sensitive areas such as stream banks, critical wildlife or fisheries habitat, or other areas that can only be partially managed for timber) and other forest types that cannot be managed for timber.

Table 10
Forest Land Base

Classification	Area (ha)	Area (ha)
Total TSA area:		**2,206,892**
Total productive forest:		**1,403,647**
Reductions:		
NSR (backlog)	37,279	
Non-commercial	9,754	
Roads and right-of-ways	32,118	
ESA	137,759	
Low site	25,705	
Deciduous	27,409	
Unmerchantable	163,159	
Timber licence reclass	1,438	
Total reductions		434,621
Additions:		
Timber licence reversions	19,168	
Total additions		19,168
Net Forest Land Base:		**988,194**

NSR Not sufficiently restocked
ESA Environmentally sensitive areas

The description of areas and volumes and the tables do not include the figures for the portions of TFLs 15, 33 and 49 that are within the three Forest Districts. The TFL areas are discussed in the issues section, but are not technically part of this planning process. Table 11 shows the three TFL areas.

Table 11
TFLs in Okanagan TSA

TFL No.	Licensee	AAC (m^3)	Area (ha)
15	Weyerhaeuser Corp.	71,000	48,583.0
33	Federated Cooperative Ltd.	27,500	8,458.4
49 a,b,c	Fletcher Challenge Canada	361,074	144,922.6
	Total	**459,574**	**201,964.0**

Table 12 shows the land classification of forests by ownership, mature and immature timber types.

Table 12
Forested Area of each Ownership

Ownership	Mature Timber (ha)	Immature Timber (ha)	Total Forested (ha)	%
Crown	775,752	527,568	1,303,320	87.5
Crown - Timber alienated	9,812	5,003	14,815	1.0
Private & municipal	32,794	80,031	112,826	7.5
Federal reserves	25	12	38	0.0
Indian reserves	13,477	13,125	26,602	1.8
Ecological reserves	1,656	716	2,372	0.2
Recreation (UREP)	1,733	1,415	3,149	0.2
Park Class A	1,738	2,084	3,823	0.3
Park Class C	0	29	29	0.0
Park Reserve	0	6,337	6,337	0.4
Provincial Reserve	8,289	6,646	14,935	1.0
Other	872	996	1,869	0.1
Total Areas	**846,148**	**643,962**	**1,490,115**	**100.0**

3.6.2 Wood Supply

Timber Volumes

Table 13 shows the volumes of mature and immature timber on the total forest land base discussed in Section 3.6.1. Timber in the TSA varies from cedar and hemlock in the wetbelt areas of the north to lodgepole and ponderosa pine in the south. Volumes are approximately 25% pine, 21.5 % Douglas-fir and lesser amounts of spruce, balsam, hemlock and cedar.

Table 13
Total Volumes of All Species in the TSA

Species	Mature Volume (m^3)	Immature Volume (m^3)	Total Volume (m^3)	%
Fir	30,454,800	34,616,200	65,071,000	21.5
Cedar	19,602,310	6,093,770	25,696,080	8.5
Hemlock	23,407,180	3,878,850	27,286,030	9.0
Balsam	31,426,060	4,162,630	35,588,690	11.8
Spruce	43,906,390	5,528,710	49,435,100	16.3
Pines	60,613,880	15,452,290	76,066,170	25.1
Larch	6,009,690	6,306,500	12,316,190	4.1
Deciduous	5,095,000	5,899,724	10,994,724	3.6
Total volume	**220,515,310**	**81,938,674**	**302,453,984**	**100.0**

Crown land with unalienated timber has a volume of 270,958,100 m^3. Sixty-six percent of this volume is mature timber and 24% immature. Of the total timber volume in the TSA, 89.6% is on Crown land. Table 14 shows the timber volumes on Crown land in the TSA, with the percentage of each species.

Table 14
Volumes of Timber on Crown Land

Species	Mature Volume (m^3)	Immature Volume (m^3)	Total Volume (m^3)	%	% of TSA*
Fir	27,183,150	26,966,310	54,149,460	20.0	83.2
Cedar	16,885,490	5,177,040	22,062,530	8.1	85.9
Hemlock	20,444,900	3,324,430	23,769,330	8.8	87.1
Balsam	30,050,770	3,762,790	33,813,560	12.5	95.0
Spruce	42,323,880	4,994,410	47,318,290	17.5	95.7
Pines	60,042,790	12,604,990	72,647,780	26.8	95.5
Larch	5,558,000	5,388,650	10,946,650	4.0	88.9
Deciduous	2,433,530	3,816,970	6,250,500	2.3	56.8
Total volume	**204,922,510**	**66,035,590**	**270,958,100**	**100.0**	**89.6**

*This column shows the percentage of each species that is on Crown land, as compared to the total volume in the TSA. For instance, 83.2% of the fir in the TSA is on Crown land.

Table 15 shows the distribution of land and timber within the three Forest Service Districts of the TSA (based on the 1988 Timber Supply Analysis Report).

Table 15
Timber Supply and Forest Land Base

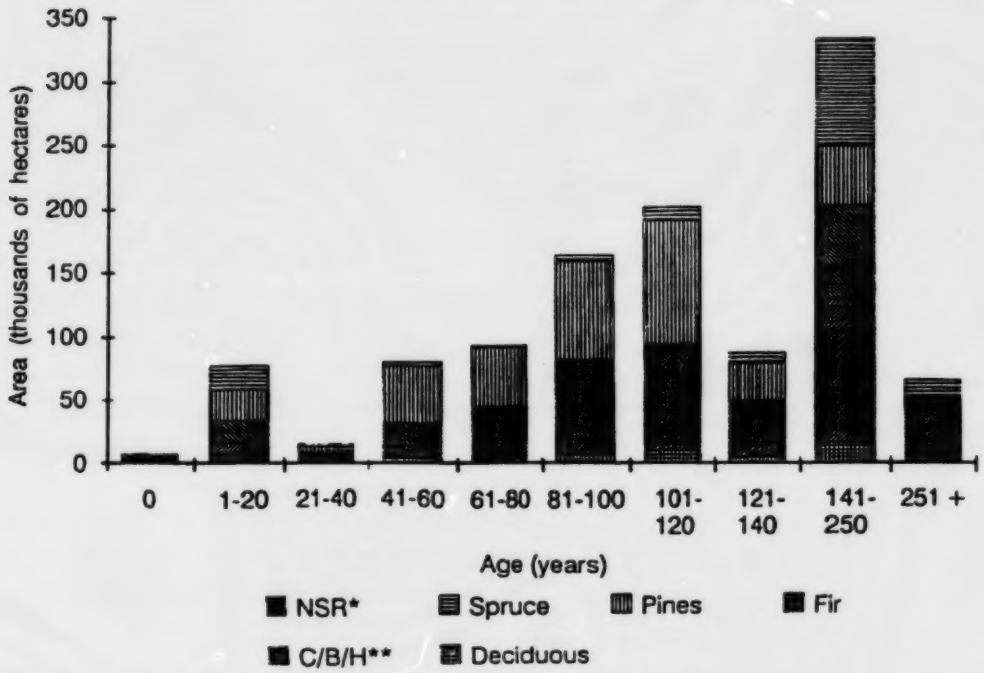
District	Land Base (ha)	% of TSA	Volume* (m^3)	% of TSA
Penticton	344,000	30.6	60,211,000	26.6
Salmon Arm	369,000	32.8	81,404,000	36.0
Vernon	413,000	36.6	84,471,000	37.4
TSA Total	**1,126,000**	**100.0**	**226,086,000**	**100.0**

This is the total timber supply. Not all is available for harvest because of management for other resource values.

Figure 1 shows how the timber is distributed by age. It illustrates a major problem of timber supply in the TSA. There are fewer areas of

forest in the 20 to 40 year age classes; the largest areas are in the mature age classes. Therefore, in 40-60 years, when the forest industry comes to rely on the forests that are now 20 to 40 years old, there will be less volume available for timber harvest.

Figure 1
Age Class of Areas of Species Groups



* NSR - Not satisfactorily restocked
** C/B/H - Cedar, balsam, hemlock

3.6.3 Forest Pests

The infestation of mountain pine beetle has been widespread throughout parts of the interior of the province. As the beetle favours dry, lodgepole pine forests, it is more predominant in the southern part of the TSA. It is estimated that 17,000 ha are infested in Penticton District, 2,000 ha in Vernon, and less than 50 ha in Salmon Arm. The Forest Service management strategy has been single tree salvage, single tree eradication and to accelerate the cut in heavily infested stands as a means of reducing the spread of the infestation, and to use the volumes that would be lost from timber production if not harvested quickly. The AAC has been temporarily raised over the last several years to harvest the beetle-infested stands and prevent the spread of the beetle.

3.6.4 Harvesting Systems

Much of the Okanagan TSA is presently done by clearcut logging. The reasons for the predominance of clearcut are:

- Shade intolerant pioneer species naturally grow into even-aged forests and perform best under even-aged management.
- In some forest types, clearcut type disturbance (i.e., wildfire) is part of the natural succession (e.g., pure, even-aged, lodgepole pine).
- The clearcut harvesting system is frequently the only safe way to log.
- Clearcut is usually the most cost-efficient method of logging.
- If the area is susceptible to windthrow because of wet site or root rot, clearcut is the most desirable harvest method.
- Clearcut encourages the utilization of all trees on a site.
- For areas heavily infected with insects such as the mountain pine beetle or root rot disease, or damaged by fire or windthrow, clearcut may be the only feasible harvesting method.
- Planting of a clearcut allows for full occupancy of a site and tree improvement.
- A clearcut harvesting system allows for change of species for biological requirements such as threat from insects or disease.

3.6.5 Silviculture

Figure 2 shows the total area harvested, broken down by stocking status, and method of regeneration to October 1, 1987. This graph shows that up to that time, 77.5 % of the area logged had been restocked. Since then, much of the NSR land has been planted and the remainder of backlog will be restocked by the year 2000.

Figure 2
Regeneration and NSR

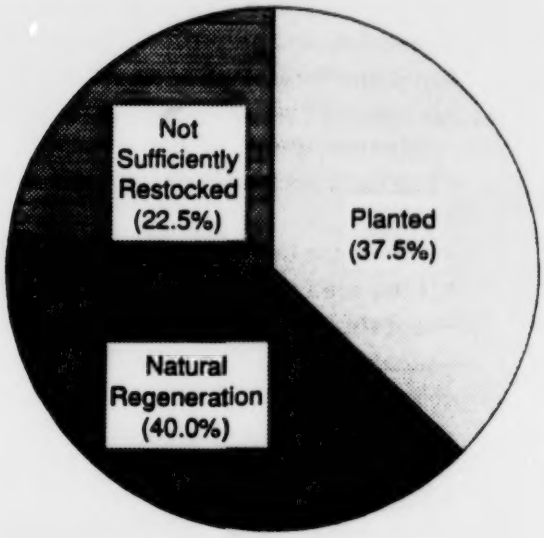
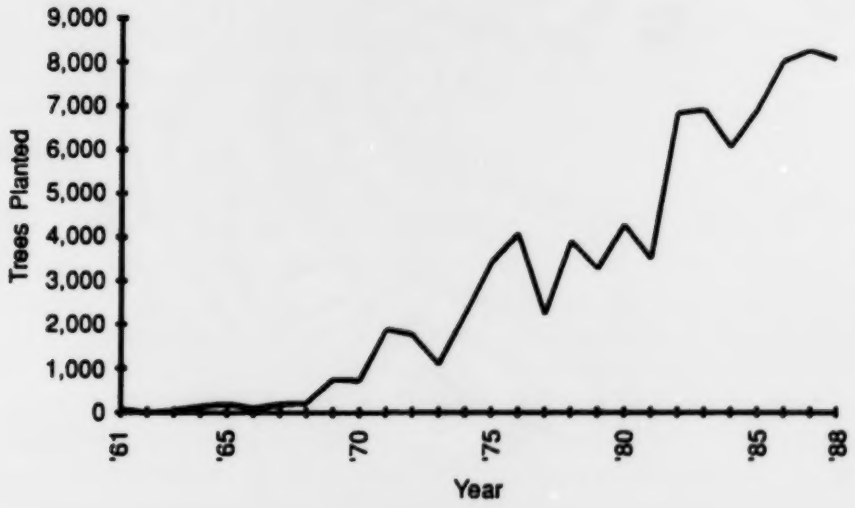


Figure 3 shows the number of trees planted since 1961.

Figure 3
Trees Planted Since 1961



Since 1987, the Forest Act has stated that the Forest Service and forest companies must carry out basic silviculture on provincial Crown forest lands. This means that logged areas must now be either planted or

naturally regenerated with healthy trees in a specific period of time. Basic silviculture must occur to sustain an appropriate level of harvest and return forest land to a forested state. Silviculture is an essential part of forest management and, since 1987, has been considered as a cost of logging, just like road building and the purchase of logging equipment and fuel.

Planting costs average $700/ha and spacing $500/ha. A fully stocked and free-growing hectare can cost up to $2,000 (which includes site preparation and survey costs), but the value to society in terms of future wood supply, present jobs created, future jobs secured, benefits to recreation, range, wildlife and water are considerable.

Some deciduous trees are beneficial to maintain a diverse forest, but large areas can be taken over by non-merchantable species, effectively reducing the productive coniferous forest and therefore the productive forest land base. Under the recent Forest Resource Development Agreement (FRDA) silviculture program, much of the NSR and brush areas have been reforested. The net effect of backlog reforestation is to maintain the forest land base.

Specific concerns related to basic silviculture in the Okanagan TSA are:

- the problems associated with the regeneration of high elevation spruce/balsam sites;
- the impact of cattle on young plantations; and
- the high incidence of root disease, especially in the northern part of the TSA.

3.6.6 Forest Industry

Studies done by Forestry Canada[1] indicate that every 1,000 m^3 of wood cut in British Columbia produces 1 direct job and 2.6 indirect jobs. Therefore, the TSA, with an AAC of 2.7 million m^3 produces 9,720 jobs in the logging, manufacturing and service industries related to forestry. The forest industry represents 9.9% of the total workforce of 98,130 people. In addition, for every cubic metre of wood cut, $140 is contributed to the economy (Gross Domestic Product) and $19 is added to government revenue in the form of stumpage, taxes, and such.

Penticton Area

Weyerhaeuser Canada Ltd. operates a mill at Okanagan Falls, Canwood and Greenwood. The latter two mills are smaller, high value, specialty product mills. There are private tree nurseries at Summerland and Osoyoos.

[1] ___ *Impact of Forestry Activity on the Economy of Canada and Its provinces: an Input - Output Approach.* Forestry Canada, 1988.

Kelowna Area

Fletcher Challenge Canada Ltd. operates a large integrated sawmill and veneer-plywood plant at Kelowna. In addition, M & L Wood Preservers operated a post plant at Kelowna in 1986. L. Russo Sawmills now operates in Kelowna; Gorman Bros. Lumber Ltd. operates a mill at Westbank.

Vernon Area

Weyerhaeuser Canada Ltd., Gorman Bros., Bell Pole Ind. and R.V. Schmidt have mills at Lumby, Riverside Forest Products Ltd. has a sawmill and veneer plant, and Tolko Industries Ltd. has a mill at Lavington. There is also a private tree nursery, seed orchard and research station.

Spallumcheen Area

Fletcher Challenge Canada Ltd. has a sawmill and veneer-plywood plant at Armstrong. There is also a post and rail operation in Monte Lake. Considerable additional forest-related employment is provided in tree nurseries. Weyerhaeuser and Fletcher Challenge operate private tree nurseries.

Salmon Arm Area

The forest industry is the most important employment sector in the Salmon Arm area. The largest manufacturing plant is the Federated Co-operatives Ltd. plywood and sawmill complex at Canoe, with a sawmill shift capacity of 215 mfbm and 86 mm sq ft per year plywood capacity. The Westar Timber Ltd. mill in Malakwa is a cedar specialty mill with a shift capacity of 95 mfbm. Two smaller sawmills (Lakeside Timber Ltd. at Tappen and Paragon Wood Products Ltd. of Grindrod) have a total shift capacity in excess of 100 mfbm and two shake and shingle mills with a combined capacity of 415 squares per shift. Okanagan Lumber Services at Ashton Creek, North Enderby Timber, and Cook Creek Sawmills at Enderby are small mills contributing significantly to local employment. Additional forest industry employment is provided by a pole operation at Sicamous and the Skimikin Nursery in Salmon Arm. There are approximately 50 small sawmills operating in the area and the cedar salvage industry supplies raw material for shake and shingle mills.

3.7 Fish and Wildlife

3.7.1 Wildlife Habitat

Wildlife habitat can generally be identified by the following biogeoclimatic zoning system. A biogeoclimatic zone has a specific

climate and type of forest or grassland. A description of each zone is outlined in Section 2.1.

Bunchgrass

Although one of the smallest biogeoclimatic zones in the province, this zone supports a wide diversity and density of wildlife. A large number of wildlife species in this zone are of provincial or national significance because of their rarity or uniqueness. Many are restricted to the southern half of the Okanagan Valley, such as the great basin pocket mouse, pallid bat, spotted bat, canyon wren, white-throated swift, burrowing owl, great basin spadefoot toad and tiger salamander. The extensive grasslands provide grazing habitat for Rocky Mountain elk, California bighorn sheep and a host of smaller mammals, birds and reptiles. Wildlife dependent on this habitat may be adversely affected by the over-grazing of domestic livestock and by the introduction of noxious weeds.

Moist, shady draws produce a completely different wildlife habitat from the adjacent dry steppes. These are very productive sites, supporting species from the adjacent Ponderosa Pine zone.

Riparian areas (those adjacent to waterbodies) support a rich fauna of breeding birds. Lakes and streams in this zone either remain open year-round or are the first to thaw in the spring. As such they provide important staging areas for migrating waterfowl in the spring.

Common Wildlife	Special Concern
Rocky Mountain Elk	Burrowing Owl
Mule Deer	Short-horned Lizard
Coyote	Prairie Falcon
Yellow-bellied Marmot	White-throated Swift
Vesper Sparrow	Night Snake
Bank Swallow	Canyon Wren
Western Bluebird	Nuttal's Cottontail
	Sage Thrasher
	Grasshopper Sparrow
	California Bighorn Sheep
	Pallid Bat
	Spotted Bat
	Tiger Salamander
	Anatum Peregrine Falcon
	Sage Grouse*
	Sharp-tailed Grouse*
	White-tailed Jackrabbit*

*no longer found in this area

Ponderosa Pine

The short, largely snow-free winters of this zone attract many animals during the winter months. Mule deer, white-tailed deer, bighorn sheep and Rocky Mountain elk may migrate long distances to winter in this zone. Flocks of mixed species of birds that come down from higher elevations are also found in this zone during the winter months.

Open stands of ponderosa pine provide habitat for many types of birds and the open forest canopy allows in light for the production of shrubs palatable to wintering ungulates. Denser stands of Douglas-fir and ponderosa pine provide thermal cover for wintering ungulates and an abundant seed and insect source for a variety of birds and small animals.

Common Wildlife	Special Concern
Mule Deer	Lewis' Woodpecker
White-tailed Deer	Rattle Snake
Rocky Mountain Elk	Townsends' Bigeared Bat
Red-breasted Nuthatch	Pallid Bat
Gopher Snake	California Bighorn Sheep
Northwestern Chipmunk	Turkey Vulture
Badger	White-headed Woodpecker
	Western Small-footed Myotis

Interior Douglas-fir

Most of the wildlife in this zone share habitat in the Ponderosa Pine zone.

Common Wildlife	Special Concern
Mule Deer	California Bighorn Sheep
Black Bear	Cascade Golden-mantled Ground Squirrel
Moose	Flammulated Owl
Hoary Bat	
Northern Pocket Gopher	
Bobcat	

Montane Spruce

This zone is characterized by cold winters with deep snow cover and short, warm summers. Wildlife that inhabit this zone are adapted to either survive or avoid the deep snows of winter. With the exception of moose, most ungulates migrate to the Interior Douglas-fir and Ponderosa Pine zones in winter.

The extensive stands of lodgepole pine provide summer and fall range for moose and mule deer, offering good thermal and hiding cover in the dense regeneration thickets. Birds that forage on bark-inhabiting insects (such as the three-toed woodpecker and black-backed woodpecker) are found in these habitats.

Steep, south-facing grassland slopes, though not extensive, are important foraging areas for California bighorn sheep, Rocky Mountain bighorn sheep, mule deer, golden-mantled ground squirrel, golden eagle and mountain bluebird.

Riparian areas and waterbodies are very important habitats for a variety of mammals, birds and amphibians because of the generally dry nature of much of this zone in the summer months. Moose and mule deer select these habitats in the summer to rear their calves and fawns because of the abundant forage and dense security cover.

Common Wildlife	Special Concern
Moose	Grizzly Bear
Mule Deer	Caribou
White-tailed Deer	
Porcupine	
Snowshoe Hare	
Lynx	

Engelmann Spruce - Subalpine Fir

This zone has a similar climate to that of the Montane Spruce zone, but with deeper snow cover and wetter summers. Ungulates such as moose, mountain goat and mule deer are found in this zone. Moose may occasionally winter in some of the drier regions of this zone, but normally leave during winter to escape the deep snowfall. This zone is one of the most productive zones for grizzly bears.

Conifer forests make up the most common habitat and are important for marten, fisher, red squirrel and wolverine, as well as a variety of seed-eating birds such as the red crossbill, white-winged crossbill, pine sisken and Clark's nutcracker.

Young forests resulting from logging and wildfire provide habitat for a wide variety of wildlife. Many species of ungulates select these habitats during summer.

Common Wildlife	Special Concern
Moose	Caribou
Marten	Grizzly Bear
Lynx	
Red-breasted Nuthatch	
Pine Sisken	
Spruce Grouse	
Clark's Nutcracker	
Mountain Goat	
Hoary Marmot	

Interior Cedar - Hemlock

The climate of this zone is characterized by cool, long, snowy winters and warm, dry summers. Many of the species of the Montane Spruce and Engelmann Spruce zones share this zone.

Common Wildlife	Special Concern
Mule Deer	Grizzly Bear
White-tailed Deer	
Mountain Goat	
Black Bear	
Stellar's Jay	
Moose	

Alpine Tundra

The alpine tundra, essentially a treeless region characterized by a harsh climate, is found on the high mountains in the TSA. The long, cold winters and short, cool growing seasons create conditions too severe for the growth of most woody plants - except in dwarf form. Hence this zone is dominated by dwarf shrubs, herbs, mosses and lichens. This zone has high recreational appeal and provides important range for caribou, mountain goats and mountain sheep. Given the severe climate, it is a very sensitive habitat.

Common Wildlife	Special Concern
Mountain Goat	California Bighorn Sheep
Mule Deer	
Water Pipit	
Wolverine	
Hoary Marmot	

3.7.2 Areas Set Aside for Wildlife Habitat Preservation

Wildlife Reserves

Wildlife Reserves are areas reserved for to protect wildlife and fisheries habitat or to facilitate recreational use. These areas are usually Crown land or held under lease from private owners. Hunting and fishing may be permitted in these areas.

Antlers Saddle* - South of Peachland - deer winter range

Ashnola River* - east of Cathedral Park - California bighorn sheep

Garnet Valley* - north of Summerland - deer winter range

Osoyoos Oxbows* - Inkaneep Cr. - Wildlife Reserve for birds, and reptiles such as burrowing owl, white-headed woodpecker, turkey vulture, California quail, bats, lizards, bull snake, rattlesnakes

Robin Way Marsh - south of Kelowna - waterfowl

Salmon Arm Foreshore - Bird and waterfowl nesting area

Skaha Lake East* - California bighorn sheep winter range

Shorts Creek* - southwest of Vernon, west shore Okanagan Lake - California bighorn sheep

Swan Lake - north of Vernon - waterfowl

Trepanier Creek* - north of Peachland - mule deer winter range

Vaseux Lake area - three reserves - California bighorn sheep, waterfowl, raptors, trumpeter swans, unique desert habitat

*These areas are private land not covered by leases, or are only partly covered.

Wildlife Viewing Areas

As noted in Section 2.4, wildlife viewing and natural history interpretation have significant value to the tourism industry, as well as enriching outdoor opportunities for residents of the region. It is anticipated that interest in natural history recreation will increase and this will be reflected in future forest land management decisions.

The following areas, are acknowledged as good for public viewing of wildlife. They may or may not have viewing facilities, interpretive aids or developed access.

Cathedral Park - Deer, mountain goat, California bighorn sheep, golden eagle, hawks

Pennask Lake - Spawning rainbow trout in June - partial interpretive facilities

Osoyoos Oxbows - Burrowing owl, white-headed woodpecker, turkey vulture, California quail, bats, lizards, bull snake, rattlesnakes

Salmon Arm - Bird and waterfowl nesting area. Of particular interest are the breeding displays of Clarke's and western grebes which nest between April and June

Vaseux Lake - Wildlife Reserve for California bighorn sheep, waterfowl and other migratory birds

Federal Migratory Bird Sanctuaries

These are areas where hunting of migratory birds is prohibited, except by permit.

Vaseux Lake - trumpeter swans

National Wildlife Areas

Vaseux-Bighorn - unique desert habitat

3.7.3 Fish

Most lakes and streams are well stocked with rainbow and lake trout, kokanee and Dolly Varden. The most important streams within the TSA are Eagle, Shuswap, Okanagan, Kettle, Similkameen, Wap, Ashnola, Mission, Powers, Peachland, Trepanier, Lambly, Mill, Coldstream, Bessette, Duteau, Kingfisher, Scotch, Seymour, Ratchford, Salmon and Noisy creeks. These streams are either important as a fishery or important as fish production areas. Category A lakes are of special interest for fish production and recreation.

3.8 Water and Watersheds

The southern Okanagan is one of the driest areas in Canada, with semi-desert conditions in some areas. Management of the bunchgrass and dry Douglas-fir and ponderosa pine forests for water, timber production, range and wildlife is complicated by the fact that some of the best soils for agriculture and best living areas for people are in the dry valley bottoms.

A 1984 government policy stated: "All Crown land in Community Watersheds will be planned and managed on an integrated resource management basis with priority given to the protection of water supplies."

Table 16 shows the watershed source, user and drainage area of Community Watersheds in the Okanagan TSA.

Table 16
Community Watersheds

Source	User	Drainage Area (sq. mi.)
Bass Creek	Seymour Arm	1.5
Brash Creek	Enderby	10.7
B X Cr.	Vernon	27.2
Duteau Cr.	Lumby	76.3
Duteau Cr.	Vernon	"
East Canoe Cr.	Salmon Arm	10.0
Fortune Cr.	Armstrong	15.9
Fortune Cr.	Highland Park	"
Fortune Cr.	Lansdowne	"
Fortune Cr.	Otter Lake	"
Fortune Cr.	Pleasant Valley	"
Fortune Cr.	Round Prairie	"
Fortune Cr.	Silver Star	"
Glanzier Cr.	Stepney	3.0
Gordon Cr.	Salmon Arm	5.9
Hobson Cr.	Salmon Arm	1.3
Hudson Cr.	Anglemont Utilities Ltd.	1.8
Huntley Cr.	Larkin	1.5
Hydraulic Cr.	S.E. Kelowna	35.0
Irish Cr.	Grandview	3.7
Kalamalka L.	Grandview	223.0
Kalamalka L.	Coldstream	"
Kelowna Cr.	Ellison	28.2
Kelowna Cr.	Glenmore	"
KLO Cr.	Glenmore	35.0
Lambly Cr.	Lakeview	88.6
Mission Cr.	Black Mountain	238.2
Mission Cr.	Rutland	318.0
Oyama Cr.	Wood Lake	21.3
Peachland Cr.	Wood Lake	45.5
Penticton & Ellis Cr.	Penticton	123.9
Powers Cr.	Westbank	55.5
Robinson & Naramata Cr.	Naramata	27.8

Source	User	(sq. mi.)
Rumball Creek	Salmon Arm	
Sicamous Creek	Sicamous	
Trepanier Cr.	Peachland	90.0
Trout and Eneas Cr.	Summerland	304.9
Vernon Cr.	Winfield & Okan. Centre	32.7
Whelan Cr.	Ellison	3.2
White Cliff Gulch	Salmon Arm	1.0

There are also numerous unregistered smaller watersheds used as private water sources.

3.9 Mining

Local mineral resources, particularly in the vicinity of the old mining town of Hedley, have been intensively studied in recent years. At Nickel Plate mine on the border of the TSA near Hedley, where Corona Corp. operates a combined open-pit and underground gold mine. Production began in the second quarter of 1987; milling capacity is 2,700 tonnes per day and current reserves are sufficient to permit operations until late 1997. In 1989, 1,065,026 tonnes were milled and total average employment was 181 people. While the mine is outside the TSA boundary, most of the employees reside in the Penticton area. (Table 17)

In the Fairview Camp near Oliver, Valhalla Gold Group Corp. proposes re-opening an old mine. If it proceeds, the project would operate at 270 tonnes per day for up to 10 years with a workforce of about 40.

The Mascot gold mine is in the Penticton area. Small gold and silver producers operated near Okanagan Falls in the 1970s. This location is currently undergoing considerable exploration activity.

A proposal for a garnet mine at Mt. Riordan by Polestar Inc. is now before the Ministry of Energy, Mines and Petroleum Resources.

Quinto Mining Corp. proposes reactivating the old Chaput Silver property north of Lumby. Work on a pilot operation began late in 1987. If the mine is developed, it is expected to employ about 58 workers. Production would be 250 tonnes per day, giving a possible mine life of seven years. Exploration activity in the area has recently led to a number of precious metal discoveries that may have some development potential. More than 1.25 million tonnes of gypsum for building products were quarried at Falkland between 1925 and 1956. No other mining activity of note has been conducted in the area. Exploration has revealed the presence of a number of highly

interesting silver-lead-zinc deposits in a narrow belt just northeast of Shuswap Lake that may have potential for development in the future.

Table 17
Metal Mines and Employment, 1989

	Milled (tonnes)	Total Average Employment
Brenda Mines[1]	11,562,626	413
Nickel Plate[2]	1,065,026	181

[1]*Mine closed in 1990.
[2]**Mine not in TSA but most employees live in Penticton.

3.10 Non-Forest Products Manufacturing

Oliver Area

The largest manufacturing concern is General Coach Division of Citair Inc., with a motor home factory in Oliver. Other manufacturing includes bakeries, concrete products, machine shops, ready-mix concrete, printing and publishing, woodworking, furniture, agricultural products and agricultural equipment.

Penticton Area

Manufacturing activity in the area includes a wide range of products. The largest employer (excluding sawmills) is Moduline Industries Ltd., a manufacturer of mobile or prefabricated housing. Other large employers include Okanagan Mfrs. Ltd. (RV's), Okanagan Spa Co. (hot tubs), Peerless Page Industries Ltd. (industrial trailers), Penticton Foundry Ltd., Greenwood Forest Products Ltd. (panes and components), and Canwood Furniture Factory Ltd. (furniture components). Additional manufacturing ranges from the building of products and agricultural equipment to bakeries, wineries, metal fabrication, fruit processing and printing.

Peachland Area

Manufacturing in the Peachland area includes wine, brandy, cider, baked goods and building products.

Kelowna Area

Leading employers are Hiram Walker & Sons Ltd. (distillery), Western Star Trucks Inc. (heavy duty trucks), Sun-Rype Products Ltd. (juices and processed fruit), Okanagan Houseboats Ltd., Kelowna Daily Courier (printing), Calona Wines Ltd., and Maloney Steel Ltd. (fabricating). Other manufacturing includes bakeries, soft drinks,

plastics, millwork, upholstery, cabinets, ready-mix concrete, precast concrete, machine shops and truck parts.

Vernon Area

The leading manufacturer in the Vernon area is Consumers Glass Company Ltd., with a glass container plant at Lavington. Other manufacturing includes Dairyland, Kal Tire Ltd. (retreading), Far West Industries Inc. (sports clothing), and Alcan Pipe Div. of Aluminum Co. of Canada Ltd. Non-forestry manufacturing is not as diverse as in Kelowna, but includes soft drinks, bakeries, leathers, building components, upholstery, cabinets, boats, machine shops, ready-mix concrete, concrete products, printing and publishing, meat products fiberglass products.

Spallumcheen Area

Large employers include Bigfoot Industries (RV's), Colonial Farms Ltd. (poultry processing) and Rogers Foods Ltd. (flour mill). Non-forestry manufacturing in 1987 included slaughterhouses, bakeries, printing and publishing, feed mills, a culvert plant, and two plants producing bathroom products.

Salmon Arm Area

The largest non-forestry products manufacturer is Newnes Machine and Ironworks Ltd., producers of sawmilling equipment. Others include slaughterhouses, a dairy, bakeries, ready-mix concrete, concrete products, printing and publishing, upholstering, boatbuilding, prefabricated buildings, windows, monument stones, machine shops, and a manufacturer of blasting products.

4 Okanagan TSA Resource Management Planning Process

This section describes the planning process that led to the preparation of this resource management plan. The planning process involved Forest Service staff, other government agencies, resource users and the general public over a two-year period.

Before a management plan was prepared, resource management issues and possible strategies, resource users and the public concerns and views had to be identified. This was done at meetings and Open Houses. Following this, a draft Options Report was prepared that outlined four possible directions for resource management in the area. Resource users and the general public were again consulted, and the Options Report was finalized. The Options Report was reviewed by the Chief Forester, who then made his determination. This was followed by the preparation of this resource management plan.

4.1 Identification of Issues, Spring and Summer 1990

The first phase of this process was the preliminary identification of issues that the Forest Service's planning, recreation, range, silviculture and timber management staff thought were important. Maps were developed that gave a visual presentation of the different resources such as recreation, wildlife, timber, range, water and fisheries, as well as those that presented special management problems such as areas infested with mountain pine beetle and visually sensitive areas. These "issues" and the planning process were outlined in a newsletter that was mailed to 900 people before the Open Houses took place.

Open Houses were held in five communities:

Kelowna	June 18 and 19
Penticton	June 20
Keremeos	June 21
Vernon	June 22 and 23
Salmon Arm	June 26 and 27

The Open Houses were advertised two to three weeks ahead in the local newspapers and on radio. All were set up such that each person picked up a questionnaire at the door to assist her or him to view the maps and issues statements. A video outlined the Ministry of Forests planning process so that people could get a better idea of where the Options Report and Resource Management Plan fit into the bigger picture. A number of staff were available to answer questions. Of the 459 people who attended, some spent almost three hours analyzing the maps and discussing issues. Most people spent at least an hour. People were encouraged to fill out the questionnaire before they left the hall

and 243 did so. This level of participation indicates a high level of interest and concern.

4.2 Development of the Options Report, Fall 1990

The information gathered at the first Open Houses was used to prepare a draft Options Report that outlined alternatives for how the Ministry proposed to manage the forests of the area for timber, range and recreation given all the public's concerns.

An analysis was done to show how different management options affected each other and what the costs and benefits were. Alternatives were considered and the Ministry asked, "What if timber harvest was accelerated or decreased. What effect would that have on water, wildlife, jobs, community stability, etc? What if more area was put aside for wilderness, parks, wildlife, etc?"

A second round of Open Houses was held to present the results of the first meetings back to the public and also to present the draft of the Options Report. The public was requested to comment on the information and to make sure that most concerns were represented. Another newsletter and questionnaire was used to assist people in dealing with the information. The results of this questionnaire were analyzed to ensure that the Options Report reflected people's concerns.

4.2.1 Results of the Questionnaires

As Table 18 shows, 800 people attended the second series of Open Houses and 982 filled out the questionnaire.

Table 18
People Who Attended the Open Houses

	Kelowna	Penticton	Keremeos	Vernon	Salmon Arm	Total[1]
Attended	217	123	10	397	53	800
Ques. Completed	142	50	7	206	34	982
% Ques. Completed	65	41	70	52	64	55
Urban Dwelling	107	24	3	110		
Rural Dwelling	28	20	7	76	29	

[1]TSA total includes questionnaires mailed in or delivered to district offices.

The questionnaire outlined the four options presented in the Options Report (these are described in Section 5):

1. Current Resource Management Option
2. Increased Resource Management Option

3a and 3b. Increased Emphasis on Non-Timber Values Option

4. Timber Harvest Emphasis Option

Table 19 shows the number of people who agreed with each option. Some agreed with more than one option.

Table 19
Agreement with Options

Option	No. Agreed	% Agreed*	No. Disagreed	% Disagreed*
2	656	66.8%	233	23.7%
3b	210	21.4%	606	61.7%
3a	125	15.7%	644	65.6%
4	67	6.8%	753	76.7%
1	58	5.9%	771	78.5%

*Percentages are compared to the number of people who responded to the questionnaire - 982

4.3 Development of the Resource Management Plan, November 1990 - June 1991

The Regional Manager in Kamloops collected all public comments that he received from letters, questionnaires and briefs, and he made his recommendations to the Chief Forester. The Options Report and public response were presented to the Chief Forester so that he could select a level of harvest for timber and set recreation and range objectives. In selecting management alternatives, he used the Options Report, other technical information from the Ministry of Forests and other government agencies, and input from the public.

Following the Chief Forester's determination, the Ministry, with input from the public, developed this "Resource Management Plan" for the area. It defines, in more detail, where and how the timber, range and recreation resources will be developed while considering the issues (wildlife, water, wilderness, etc.) developed with the public at the Open Houses and meetings, and the management alternatives discussed in the Options Report. This management planning process involves a series of public meetings to discuss ways of managing resources in the TSA. The Timber Harvesting Guidelines were reviewed, modified and integrated into the management plan.

4.4 Ongoing Planning

The planning process is ongoing as society changes and different issues become more important to the public. Under the old planning system, the Chief Forester sets management objectives for the Forest Service every five years. Because the public is demanding more say in the management of natural resources, the Ministry is becoming more involved in seeking the public's views on a wide variety of natural resource issues.

5 Resource Management Options

During the Options Report process, issues were identified which affect management of timber, range and recreation programs that are administered by the Forest Service. The following options were developed, taking all natural resources in the TSA into account, as well as the needs for jobs, community stability and social and environmental concerns. For a more complete discussion of the issues and options, refer to the Options Report which is available at Forest Service district offices. A summary of the options presented to the Chief Forester in the Options Report are as follows:

Current Resource Management Option

This option assumes that the Ministry would continue to use and manage resources at the current level. The timber harvest would remain at 2.7 million m^3. Range and recreation program funding levels would remain at present levels. The implications are that there would be timber supply, water, wildlife and environmental management problems in the future.

Increased Resource Management Option

This option is similar to the Current Option except that there would be increased emphasis on integrated resource management, range, recreation and silviculture programs. Staff and funding would increase so that all areas are reforested and some areas intensively managed. It could be increasingly difficult to satisfy demands for old growth protection, wilderness, wildlife and recreation.

Increased Emphasis on Non-Timber Values Option

This option is similar to the Increased Resource Management Option except that there would be a reduction in the AAC to allow for more emphasis on forest values other than timber harvest. Two reduction levels were considered: to 2.5 and 2.3 million m^3. The implications of reducing the AAC at once or over a 10-year period are described. A reduction in the AAC would reduce the falldown effect in 20 years and would provide more management alternatives to protect and enhance non-timber values.

Timber Harvest Emphasis Option

This option would increase the AAC to 3.1 million m^3 and provide for an increase of 400 direct, and 1040 indirect jobs, and increase related economic spin-offs. It would become increasingly difficult to provide mature, accessible timber to mills after 20 years because of the predicted falldown in AAC. Provisions for management of environmental issues such as water, wildlife, visual landscapes, wilderness and old growth protection would become more difficult.

6 Chief Forester's Determination

As defined in the Forest Act, the Chief Forester has the responsibility to:

1. Set an Allowable Annual Cut which will allow the Ministry of Forests to direct the harvest of timber to support mills in the TSA;
2. Set an objective for range management that will allow the Ministry to manage forage for wildlife, and domestic livestock requirements and to licence Crown lands for grazing by the ranching industry;
3. Set objectives for the management of forest and range lands for public recreation so that opportunities for all types of recreation experiences and activities can be maintained.

The Chief Forester reduced the AAC to 2,615,000 m^3 from 2,700,000 effective January 1, 1992. This includes 50,000 m^3 per year to encourage the utilization of the sawlog reject component of stands of decadent cedar and hemlock species. Because of the mountain pine beetle epidemic, there is a temporary AAC uplift of 200,000 m^3 for the years 1990 to 1992.

The current level of range use of 97,063 AUMs will be maintained. To achieve this target on a sustainable basis, an increase in the level of management for range is required.

The objective of the recreation program will be to meet the current demand for forest-oriented recreational use and aesthetic quality. An increased level of management is required to achieve this objective as well.

In making his decision, the Chief Forester considered the following items:

- the various local resource use plans and guidelines which incorporate more stringent local factors than those predicted in the TSA level assumptions.
- the continuing overall increase in the demand for non-timber forest use, and management considerations indicated by other resource agencies.
- a level of public support for maintaining the current harvest level, provided there is an increase in intensive forest management.
- aggressive forest renewal programs which have been in place for several years.

The assumptions and implications of this decision are as follows.

Assumptions:

- The forest land base used for timber production will be gradually reduced by population growth pressures and other issues such as old growth, wilderness, wildlife protection and the maintenance of visually pleasing landscapes.
- There will be a temporary AAC uplift of 200,000 m^3 per year from 1990 to 1992 for mountain pine beetle management.
- There will be increases in demand for water, recreation and a steady demand for range.
- The public will increasingly demand special management for water, old growth, wilderness, wildlife, aesthetics and other issues.
- Funding and staff will be provided for increased planning and public participation. This will involve other government agencies such as the Ministry of Environment, Lands and Parks, and the Department of Fisheries and Oceans, as well as the Ministry of Forests.

Implications:

- A reduced AAC will provide more management alternatives to protect and enhance non-timber values.
- There will be reduced opportunities for new range development.
- A reduction in the AAC and an increase in silviculture will make it easier to reduce harvesting rates in some community watersheds to protect water quality and quantity. This will also have benefits for fish and wildlife habitat and recreation values.
- Reductions to the AAC will allow for wilderness area protection, affording some protection for old growth forests and biodiversity.
- A reduction of 85,000 m^3 from the AAC could represent a loss of approximately 85 direct and 220 indirect jobs. In addition, annual government revenue losses could be in the order of $1.6 million and the economic spinoffs to the overall provincial economy could be reduced by up to $11.9 million.
- The spread of the mountain pine beetle will be managed and beetle-infested timber will be recovered by the 200,000 m^3 AAC temporary uplift. If the beetle epidemic persists beyond 1992, it will be difficult to manage with a reduced AAC.

7 Resource Management Strategies

The Ministry of Forests' mandate as defined in the Ministry of Forests Act is to manage the forests of the province for timber, range and recreation. In doing this, the Ministry considers a broad range of environmental, social and land use requirements within the Okanagan TSA.

This section explains how the Forest Service will manage these resources by outlining management strategies developed for each program to respond to issues raised during the 1990 Options Report process.

In the summer of 1991, the Chief Forester determined appropriate forest use levels while considering all of the available options. That determination prescribed a reduced Allowable Annual Cut in the TSA's forests to 2,615,000 m^3, maintenance of existing levels of range use at 97,063 Animal Unit Months (AUMs), and a requirement to satisfy current demand for forest-oriented recreation. The strategies described in this section are directed at implementing the specific resource management targets contained in the Chief Forester's determination.

7.1 Timber

The harvesting program includes the disposition of timber and the administration of timber harvesting under a variety of forest tenures. It also includes the collection of revenues for Crown timber and administration of the Forest Service road network. It encourages the forest industry to use the full potential of the timber available for harvesting and to take advantage of emerging opportunities.

Table 20 shows the AAC for the TSA for the period 1992 to 1996 as set by the Chief Forester. The AAC for each of the five years is 2,615,000 m^3 with a temporary increase of 200,000 m^3 for mountain pine beetle management during 1992. Therefore, the AAC for 1992 is 2,815,000 m^3 and for subsequent years, 2,615,000 m^3.

Table 20
Allowable Annual Cut

Cut Rationale	Cubic Metres
For 1992	
Allowable Annual Cut	2,565,000
Increased utilization of cedar and hemlock	50,000
Temporary mountain pine beetle increase	200,000
Total AAC for 1992	**2,815,000**
For 1993 - 1996	
Allowable Annual Cut	2,565,000
Increased utilization of cedar and hemlock	50,000
Total AAC for 1993 - 1996	**2,615,000**

The AAC includes 50,000 m^3 per year to encourage utilization of the sawlog reject component of decadent cedar and hemlock stands.

To achieve the AAC, the following harvest priorities will be maintained:

Priority 1 - Stands extensively damaged by insects, disease, blowdown or fire.

Priority 2 - Stands partially damaged by insects and disease which can be salvaged.

Priority 3 - Decadent stands that are past maturity with declining volume and value.

Priority 4 - Overmature stands

Priority 5 - Mature stands

7.1.1 Harvesting Systems

The majority of harvesting in the TSA is presently done by clearcut logging for reasons described in section 3.6.4. In some areas, particularly the dry belt fir and yellow pine areas, selection logging is the preferred system. In other areas, use of alternative silviculture systems, where feasible and practical, will likely increase. This is especially true where there are sensitive resource values such as water, wildlife and recreation. An increase in selection and other partial cutting harvesting methods, to address other resource values, may reduce yields in even aged stands (e.g. lodgepole pine).

Management Strategies

- Increase research into appropriate silviculture systems in different forest types.
- Implement and comply with the 1992 revision of the Okanagan TSA Integrated Resource Management Timber Harvesting Guidelines.
- Encourage selection, shelterwood and seed tree silvicultural systems, where appropriate, to increase species diversity, maximize growth and yield, and promote natural regeneration.
- Utilize harvesting systems that comply with guidelines established in completed Local Resource Use Plans.

7.1.2 Harvesting in Watersheds

Water is an important resource in the TSA and the demand for water increases with population growth. Harvesting in any watershed should not have a significant effect on the water resource. To achieve this, the Timber Harvesting Guidelines stipulate that in general no more than 30% of the forested land within a watershed should be in an "Equivalent Clearcut Area". This is reduced to 20% in community watersheds. In much of the northern part of the TSA a 25% maximum is used in recognition of high fisheries values. Where these maximums are exceeded a watershed hydrologic impact assessment should be completed. The objective of these guidelines is to minimize the risk of damaging changes to stream flow quantity and timing and in water quality from the cumulative effects of forest cover removal and road construction. The district manager may reduce this percentage where streams and watersheds are particularly sensitive or conversely increase the percentages where a watershed is more resilient (based on aspect, soil type, elevation, etc.).

Management Strategies

- Comply with the Timber Harvesting Guidelines to ensure protection of watershed integrity.
- Place more emphasis, where appropriate, on silviculture systems that maintain a continuous forest cover, and design clearcut systems to create a mosaic of tree species and age classes.
- Continue hydrologic research studies to gain a better understanding of the impact of various silviculture systems on water and watersheds and hydrologic recovery criteria.
- Establish a regional committee to determine methodology for calculating Equivalent Clearcut Area within the context of a watershed hydrologic impact assessment.

7.1.3 Harvesting in Riparian Areas

Riparian areas are the wet soil areas adjacent to streams, lakes and wetlands. Though riparian areas account for only a small part of the natural landscape, they are very important habitat for fish and wildlife. It is estimated that over 80% of all the wildlife in the TSA use riparian and adjacent uplands during some season or part of their life cycle. Protection of riparian areas may result in reduced timber production and cattle range availability.

Management Strategies

- Comply with the Timber Harvesting Guidelines that specify procedures designed to protect and enhance fish and wildlife habitat.

7.1.4 Forest Health

The mountain pine beetle has created a number of significant management problems, particularly in the southern part of the TSA. Where stands are not commercially harvested, the cost of clearing dead trees becomes part of the cost of reforestation. Major infestations have resulted in an accelerated cut in some watersheds, creating environmental concerns. Where timber harvesting is delayed, bluestain and checking lower the amount and value of lumber produced.

In the short term, harvesting patterns and rates of cut have been altered to deal with beetle-attacked timber. Short term increases in the AAC may effect long term timber supply and have a negative impact on wildlife habitat, water course stability and the fisheries resource.

Past and current forest management practices have not fully addressed other forest pests that are detrimental to forest health. For instance, the known incidence of root diseases has increased over the last 20 years in all forest types. Also, periodic outbreaks of defoliator insects, particularly spruce budworm, may cause unsalvageable losses.

Management Strategies

- The AAC has been raised by 200,000 m^3 until December 31, 1992, to allow for management of the mountain pine beetle and allow for the salvage of infested timber. After 1992, the Forest Service will attempt to manage the beetle within existing AAC allocations.
- Improve estimates of epidemic losses where insects or disease have caused within-stand and whole-stand losses.
- Require licensees to document in their annual reports their performance in harvesting high priority infestations.
- Implement the Mountain Pine Beetle Strategic Plan.

- Formulate a forest health strategy to identify and assess stands that currently support the timber supply and may require rehabilitation due to insect and disease infestations.

7.1.5 Merchantability (Timber Quality)

Some mature cedar and hemlock forests and high elevation balsam and spruce have a high incidence of trees with rotten cores. This low quality timber is often "non-merchantable", since the cost of logging is greater than its value delivered to a mill.

Although much of this timber has been removed from the inventory when determining the AAC, the forest industry is often not inclined to use the remaining marginal timber stands that are still part of the available timber supply. To manage the forests efficiently for long-term timber production, the poorer quality must be harvested with the good quality timber.

Management Strategies

- Include as part of the AAC, 50,000 m^3 to encourage the utilization of the sawlog reject component of decadent cedar and hemlock stands.
- Encourage licensees to manage the timber resource according to the established priorities (see Section 7.1) in their five-year development plans.
- Require licensees to document in their annual reports their harvesting performance, particularly of high priority stands and the species profile.

7.1.6 Operability

Significant volumes of timber in the TSA can not be harvested at this time for a number of reasons including:

- steep slopes
- unstable terrain, making road building difficult or impossible
- excessive distance from an operating mill
- timber of insufficient quality to warrant the expense of harvest.

This is a problem throughout the TSA, but is critical in parts of the northern Salmon Arm area, in the eastern portion of the Vernon area and in the southwest part of the TSA where the terrain is very rugged. These stands, though currently marginal from a timber harvesting point of view, may have high value for fish and wildlife, and wilderness. For these stands to continue supporting the AAC, it must be demonstrated that they can be incorporated into development plans.

Management Strategies

- Complete an operability assessment for the TSA by March 31, 1994. Timber stands will be evaluated for their physical operability, based on current technology.
- Encourage management of the full terrain and species profile for areas that support the AAC.
- Require licensees to document in their annual reports performance in harvesting the terrain and species profile.

7.1.7 Biophysical Forest Inventories

Forest inventories in the Okanagan TSA were done in the 1960s and 1970s. Since then populations have greatly expanded and society's demands from the forests have broadened.

New comprehensive forest inventories are needed to provide the information required to more effectively integrate forest management planning in the future.

Management Strategies

- Improve the basic forest and biophysical inventories in the TSA
- Co-ordinate data collection between government ministries in order to improve resource management planning.

7.1.8 Biodiversity

The Okanagan TSA supports a large variety of plant and animal life in a wide range of different forest types. A large number of wildlife species depend on dead or dying trees for at least part of their life cycle. To maintain habitat for wildlife species that require old growth forests, it will be necessary to ensure a distribution of old growth forests that represent each biogeoclimatic zone.

Management Strategies

- Comply with the Timber Harvesting Guidelines for old growth management and maintain biological diversity until the Provincial Old Growth Strategy is finalized.
- Apply the Provincial Old Growth Strategy once it is completed.
- Comply with the Timber Harvesting Guidelines for maintenance of wildlife trees (wildlife tree patches and snag component).

7.1.9 Fish and Wildlife Habitat

The demand to protect more areas for fish and wildlife is increasing. This may result in the preservation of some areas and modification of harvesting practices in others. Selection logging and other partial cutting methods may be better than clearcuts for some wildlife species in certain situations, but increased road systems and access associated with these methods may create other problems. Often the limiting factor to maintaining wildlife populations is the amount of available wintering area. These areas are usually valley bottoms which tend to be urbanized and privately owned.

Management Strategies

- Manage fish and wildlife habitat according to the Timber Harvesting Guidelines.
- Continue to address fish and wildlife habitat issues not dealt with in the Timber Harvesting Guidelines through Local Resource Use Planning initiatives.
- Examine the impacts of different harvesting systems on fish and wildlife habitat.
- Improve fish and wildlife habitat inventory information.

Reductions to the Forest Land Base

"Forest land" is described in the Forest Act as land that the Chief Forester determines will provide the greatest contribution to the social and economic welfare of the province if predominantly maintained in successive crops of trees and/or forage, or maintained as wilderness. This forest land base is constantly being reduced to account for a wide range of uses. The development of roads, hydro right-of-ways, subdivisions and farms may remove land from timber production and other forest uses. The Coquihalla Highway, for example, caused a reduction to the forest land base.

The designation of forest land for parks, wilderness, major roads, etc. reduces the area available for timber production, cattle forage and in some cases roaded recreational opportunities. This may reduce harvest levels and range opportunities unless there is a corresponding increase in the level of management.

7.1.10 Site Degradation

Permanent access roads, skid roads, and landings directly reduce the land base available for growing trees. The productivity of the land may be reduced by soil compaction caused by industrial operations or through loss of the more productive soil layers due to construction of roads and landings.

Management Strategies

- Continue research into the impact of site degradation from roads, skid trails and landings, and the potential impact on the area that supports the AAC.
- Encourage the use of harvesting and silviculture methods that reduce the area required for roads, landings and skid roads.
- Comply with the Timber Harvesting Guidelines that provide deactivation procedures for roads and rehabilitation of landings.

7.1.11 Other

The following specific uses have been identified as actually or potentially reducing the forest land base:

- Coquihalla Right of Way
- Agriculture leases
- Ecological reserves
- Ski hill visual corridors and expansions
- Monashee Park expansions
- Wildlife Management Areas in Penticton and Vernon areas
- Mine developments
- Greystokes Recreation Area
- Expansion of Highway 97
- Old growth reserves
- Wilderness area designation

Management Strategies

- Assess the economic, social and environmental implications of land use proposals that reduce the forest land base that supports the AAC.

7.2 Silviculture

The silviculture program involves restocking forest lands that have been harvested or affected by wildfire, disease and insects, and improving the value and productivity of forest stands. Table 21 outlines the five year silviculture program goals and expenditures.

Table 21
Five Year Silviculture Program Goals

	1992		1993		1994		1995		1996		Total
Activity	(ha)	000's $	(ha)	000's $	(ha)	000's $	(ha)	000's $	(ha)	000's $	000's $
Surveys	44,672	604	37,747	511	37,596	506	37,871	509	32,338	432	2,562
Planting	6,253	4,066	5,985	3,871	3,658	2,385	2,149	1,331	1,934	1,200	12,853
Site Prep	4,617	2,119	2,736	1,369	1,602	917	1,364	865	1,480	859	6,129
Spacing	1,678	1,111	2,038	1,366	1,680	1,106	1,913	1,291	1,294	873	5,747
Brushing	4,079	2,750	3,617	2,411	3,005	2,004	2,897	1,969	2,678	1,889	11,023
Total		**$10,650**		**$9,528**		**$6,918**		**$5,965**		**$5,253**	**$38,314**

Basic Silviculture

Basic silviculture is defined as those harvesting methods and silviculture operations, including seed collecting, site preparation, artificial and natural regeneration, brushing, spacing and stand tending and other operations, as are prescribed for the purpose of establishing a free growing crop of commercially valuable species.

7.2.1 Regeneration of High Elevation Spruce and Balsam Sites

It can be difficult to re-establish a new forest after harvesting or fires in high elevation spruce and balsam sites. Problems associated with reforesting these sites may affect the Forest Service and licensees' ability to achieve basic silviculture objectives.

Management Strategies

- Continue research into the reforestation of high elevation stands including use of appropriate silviculture systems.

7.2.2 Impact of Cattle Grazing on Regeneration

Cattle may cause damage by browsing new tree growth in the spring and by trampling young seedlings. Most forest land is grazed to some extent by cattle. Range management and silviculture systems must be designed to minimize the impact of grazing animals on young forests.

Management Strategies

- Establish a procedure for each ecosystem that defines the timing and duration of grazing in plantations.
- Develop a strategy to define the location and timing of forage seeding after logging to minimize the impact of cattle on seedlings.
- Encourage improved communication between ranchers and the forest industry.

7.2.3 Forest Health

A high incidence of root disease in young plantations can cause death or reduce the growth of the trees.

Management Strategies

- Continue research into managing root disease in young plantations.
- Apply appropriate silviculture systems and post logging treatments to minimize the impact of root disease and other pathogens.

7.2.4 Use of Herbicides for Vegetation Management

There has been controversy over the use of herbicides in the forests of British Columbia and a portion of the public will continue to demand its banning. In many instances, herbicides are easier to use, less expensive and biologically more effective than mechanical or manual means. Loss of the use of herbicides as a management tool could affect the ability of the Forest Service and licensees to establish a free growing crop of trees on some sites.

Management Strategies

- Reduce herbicide use by early identification of vegetation management problem areas and utilization of appropriate site preparation techniques.
- Continue the responsible use of herbicides where appropriate according to the Pesticide Use Permit as approved by the Ministry of Environment, Lands and Parks.
- Consider and evaluate alternative vegetation management systems (e.g. sheep grazing, manual brushing).
- Increase the availability of information to the public on herbicide use including demonstration and field tours

7.2.5 Slash Burning and Smoke Management

Slash burning is conducted to reduce logging debris and prepare the site for planting while reducing the potential for wildfire. The use of this tool has come under public criticism because of smoke problems in communities.

Management Strategies

- Where appropriate continue to conduct slash burning according to the Slash Burning and Smoke Management Guidelines to minimize impact on air quality.
- Plan harvesting systems at the Pre-Harvest Silviculture Prescription stage so as to reduce the need for slash burning.
- Continue research into appropriate silviculture systems that reduce the need for slash burning.

7.2.6 Fish and Wildlife Habitat

Various silviculture activities can have an impact on fish and wildlife habitat. For example, site preparation can reduce the amount of dead woody material on the forest floor which many wildlife species depend on for survival.

Management Strategies

- Continue to work with the Ministry of Environment, Lands and Parks to ensure that wildlife objectives are reflected in management plans.
- Utilize appropriate silviculture systems that maintain biodiversity and enhance identified wildlife objectives.

7.2.7 Backlog Reforestation

Before 1987 some areas were not restocked because of limitations on the availability of seedlings for reforestation. The Forest Service is now supplying funds to reforest these areas. This is referred to as "backlog reforestation." These areas may be classed as not satisfactorily restocked (NSR) or brushed-in. This means natural regeneration did not occur and seedlings were not planted, or that not enough planted seedlings survived. Often other species such as alder, aspen, and birch become established.

Management Strategies

- By the year 2000, restock all areas requiring backlog reforestation.
- Conduct basic silviculture practices on all areas logged after 1987 (this is a legislated requirement).
- Continue to monitor and evaluate all silviculture programs.

- Improve communication of the goals, accomplishments and problems encountered in the silviculture program, to other resource agencies' and the general public.

Incremental Silviculture

Incremental silviculture refers to a range of activities that can either reduce the time required for a tree to reach a merchantable size or improve the quality of the timber crop by:

- spacing trees to reduce competition and increase the growth rate;
- fertilizing to improve soil fertility and improve forest growth rate;
- pruning to improve the value of logs produced in the next crop;
- thinning to improve growth in older stands and produce a crop sooner.

Incremental silviculture is one way of increasing the quality and quantity of future timber crops on a fixed land base. The long-term implications of forest stand tending need to be well understood to maximize benefits. For example, spacing can be effective in increasing growth in young stands but it can also increase susceptibility to various diseases.

7.2.8 Age Class Distribution

Analysis of the timber profile in the Okanagan shows that there is less forested area in the 20 to 40 year old age classes (see Section 3.6.2). This means that in 40 to 60 years there will be fewer areas ready for harvest. Incremental silviculture can increase the volumes and value of timber in these forests and mitigate future timber supply problems.

Management Strategies

- Develop an incremental silviculture plan that concentrates incremental silviculture activities on high priority sites where the objective will be to alleviate future age class distribution problems.

7.2.9 Forest Health

Benefits from incremental silviculture may not be realized because of forest health problems such as root disease, spruce budworm and small mammal damage (i.e. rabbits, squirrels and porcupines). Incremental silviculture activities on certain sites can make stands more susceptible to pest and disease attack.

Management Strategies

- Initiate more research into silviculture treatments that minimize the impact of pests and diseases on forests.

7.2.10 Priorization of Silviculture Activities

Current methods of priorizing incremental silviculture activities are not sufficient to ensure that returns from the silviculture investment are maximized.

Management Strategies

- Develop a better system to improve priorization of activities by site (e.g., on a cost/benefit basis).

7.3 Outdoor Recreation

The Forest Service recreation program is designed to manage and protect the natural wildland recreation values of the province, including aesthetics and wilderness, and to enhance public enjoyment through the management of road and trail access, and recreation facilities.

The recreation program of the Forest Service has a two-fold mission: to provide the opportunity for recreation experiences and benefits through the management of the use of the provincial forest recreation resource, and to protect the provincial forest recreation resource. This mission:

- recognizes that the goal of recreation management is the provision of opportunities for satisfactory recreational experiences.
- recognizes a dual role of recreation resource management (protection of present and future recreation values) and recreation use management (provision of safe, sanitary, socially acceptable and environmentally sound recreational use).
- applies within the context of the Forest Service's overall integrated resource management mandate and in co-operation with the recreation programs of other government agencies, public groups and the private sector.
- applies to provincial forest lands outside parks and settled areas.

The provincial forest recreation resource encompasses the full spectrum of recreation values and opportunities, including wilderness, scenic landscapes, cultural and heritage landmarks, and developed recreation facilities.

7.3.1 Increasing Demand for Public and Commercial Recreation Opportunities

Tourism and local recreation are rapidly expanding sectors of the economy of the Okanagan TSA. The Coquihalla Highway to Kamloops has increased outdoor recreation use in the northern part of the TSA and the Coquihalla connector will have a major impact in the south.

It is estimated that the demand for additional outdoor recreation opportunities is increasing at a rate of 10-15% per year. The characteristics of this increase are not well defined or understood at this time. This affects the Forest Service's ability to project future needs for facilities and services as well as resource impacts and management requirements over the long term.

Demands for more recreation facilities can often be accommodated with only modest impacts on timber harvesting and cattle grazing. Of greater significance are increasing demands for preservation of natural appearing landscapes, preservation of diversified fish and wildlife species and populations, and preservation of wilderness and unroaded areas.

Management Strategies

- Intensify the collection, analysis and interpretation of current forest recreation use information.
- Increase efforts to better define public demand for forest recreation opportunities.
- Increase efforts to better define user expectations for the management of Forest Service recreation sites and trails and the level of services and facilities provided.
- Update and analyze the recreation resource and landscape inventory information to more adequately describe the state of recreation resources within the TSA.
- Upgrade or expand existing recreation sites and trails to meet increasing use.
- Develop additional recreation sites and trails to meet increasing public demand.
- Produce and distribute recreation site and trail user guides, maps and pamphlets to the public.
- Update the recreation land base classification to the following categories.

1. **Primitive Land**
   - Manage for wilderness values, non-motorized access and travel on trails, cross-country and waterways.
   - Nominate certain areas for Forest Service Wilderness or Park designation.
   - Manage others specifically with wilderness type recreation as the highest value.

2. **Semi-Primitive Non-Motorized Land**
   - Manage for wilderness values, non-motorized access and travel on trails, cross-country and waterways.
   - Minimize facility development for signing, safety and sanitary needs.
   - Manage forest landscapes to retain natural appearance.
   - Retain unroaded state.
   - Nominate certain areas for Forest Service Wilderness or Park designation.

3. **Semi-Primitive Motorized Land**
   - Manage for backcountry values, motorized access on primitive roads, trails and cross-country use by snowmobiles. Other non-motorized uses may occur.
   - Minimize degradation of sites and trails. Encourage group activities such as snowmobile clubs and ski clubs.
   - Manage forest landscape for visual concerns.

4. **Roaded Resource Land**
   - Manage for motorized access uses. Non-motorized uses may take place.
   - Manage for site-specific recreation use on recreation sites, trails and other areas.
   - Minimize degradation of sites and trails.
   - Manage for appropriate visual concerns.

5. **Rural**
   - Allow local government to manage recreation and provide facilities as needed.
   - Have commercial enterprises or community groups complete development.
   - Manage for appropriate visual concerns.

6. **Urban**
   - Have local government facilitate recreation development.
   - Manage for appropriate visual concerns.

7.3.2 Increasing Demand for More Designated Wilderness and Retention of Unroaded Areas

Although a wide variety of recreation opportunities are available to residents and visitors, only about 15% of the provincial forest land base in the Okanagan TSA remains in an unroaded state and 6%, or 117,500 ha, (see Table 22) have significant recreation resource values. This supply could limit the Forest Service's opportunities to meet future, if not present, demands for additional formally designated Wilderness and retention of unroaded areas managed primarily for recreation values.

It is expected that demands for formal Wilderness and wilderness type recreation opportunities will continue to increase and backcountry recreation will form an expanding component of the tourism industry within the TSA. It is reasonable to expect that some of this expansion will focus on the need to retain unroaded areas as a land base for commercial recreation opportunities.

Table 22 shows the primitive and semi-primitive (unroaded) areas within the TSA that have significant wilderness recreation values.

Table 22
Primitive and Semi-Primitive Unroaded Areas

Forest Area	Hectares	District
Upper Seymour River	23,022	Salmon Arm
Monashee North	3,340	Salmon Arm
Jordan Range	17,480	Salmon Arm
Snowy Mountain/Joe Lake	8,000	Penticton
Trapper Lake/Centennial Trail	6,000	Penticton
Brent Mtn./Sheep Rock	1,000	Penticton
Greystokes	14,000	Penticton
Greystokes	1,200	Vernon
Greenbush Lake[1]	30,000	Vernon
Tsuius Mountain	6,000	Vernon
Pinnacles	2,400	Vernon
Findlayson Lakes	2,500	Vernon
Kate Lake	2,500	Vernon
Total	**117,442**	

[1] Proposed for further evaluation as a Wilderness Area under the Forest Act.

Management Strategies

- Further evaluate through a planning process, the wilderness values of the recreation areas presently classified as primitive and semi-primitive non-motorized (as shown on Table 22).
- Revise and update the recreation Inventory (Recreation Opportunity Spectrum), to describe unroaded areas more accurately within the TSA.
- Initiate Wilderness Management Plans for any areas designated as Wilderness under Section 5.1 of the Forest Act.
- Work with other government agencies, interest groups and the public in the development of a provincial strategy to protect, preserve and manage the wilderness resource.

7.3.3 Increased Demand to Retain Naturally Appearing Landscapes

The public is increasingly concerned about the visual impact of traditional road building and logging practices. Often tourists express displeasure at the sight of clearcuts adjacent to recreation development or within sight of lakes. Modified logging practices, such as selection logging and smaller clearcuts, can reduce the visual impact of logging without having a major effect on the harvest. Large preservation areas, however, could have a major impact on the area available for timber harvesting.

Naturally appearing landscapes are important marketing features of most commercial outdoor recreation developments. A reduction in landscape quality may have negative economic impacts, particularly on backcountry recreation suppliers who market natural landscapes as part of the recreation experience.

The Landscape Management Zone and Lakeshore Zone in the Okanagan TSA Integrated Resource Management Timber Harvesting Guidelines provide for specific visual quality measures to be taken within harvesting or road building plans. The Landscape Management Zone specifies four levels of increased management for visual quality: Preservation Subzone, Retention Subzone, Partial Retention Subzone, and Modification Subzone. (See Glossary for definitions.)

Management Strategies

- Implement the Landscape Management guidelines contained in the Timber Harvesting Guidelines throughout the TSA.
- Complete or update the landscape inventory and analysis mapping including assignment of recommended Visual Quality Objectives by March 31, 1994.
- Where necessary develop and implement Detailed Local Resource Use Plans, on a priority basis, to address landscape concerns in visually sensitive areas.
- Initiate research to better define the impact of landscape management on harvesting levels and practices within the TSA.

7.3.4 Management of All-Terrain Vehicle Use

Inappropriate all-terrain (ATV) and off-road vehicle use poses problems for the management of some resources (e.g., wildlife, environmentally sensitive areas) and often conflicts with other resource users, particularly wilderness oriented recreation users.

The provincial forest land base is used extensively by all-terrain and off-road recreation vehicle enthusiasts. However, conflicts are increasing and more effective legislation and regulations are required to manage ATV use by type of vehicle, area, season and duration of use.

Management Strategies

- Encourage dialogue between individuals and user groups to reduce potential conflict.
- Initiate Coordinated Access Management Planning on a priority basis where unregulated access and off-road vehicle use conflicts with other resource interests.

7.4 Range

The range program provides stewardship, conservation, rehabilitation and enhancement of provincial range lands, administers range tenures and collects revenues from range licensees.

The Chief Forester specified that the current level of range use, 97,063 Animal Unit Months (AUMs), will be maintained. To achieve this target on a sustainable basis, an increase in the level of management for range is required.

7.4.1 Range and Timber Harvesting Interactions

A number of range issues are related to timber harvesting:

- Logging often disrupts grazing systems. Cattle are drawn out of the forest by open spaces created by clearcutting.
  - Damage to tree seedlings may occur.
  - Conifer stocking rates may be reduced.
- Logging increases forage productivity for 10 to 20 years because of an increase in sunlight reaching the forage plants.
- Logging slash may impede the movement of cattle or wildlife, which may make forage unavailable.
- The quality of range and length of season can be increased by seeding logged areas for cattle forage. Seeding with domestic forage species may increase wildlife populations or make them healthier.
- Logging may damage range improvement structures (fences, trails, water developments).
- A steady rate of logging is required to ensure a continual supply of grazing areas.
- Logging can remove natural barriers resulting in lost grazing opportunities.

Management Strategies

- Encourage better co-ordination at the Five-Year Development Plan stage to address issues early.
- Manage grazing systems (cattle movements, turnout dates, length of stay in a pasture) to accommodate silviculture activities or make the best use of improved forage.

7.4.2 Range and Reforestation Interactions

There are a number of related issues in the interaction between range and reforestation:

- Livestock may damage young trees and, where excessive, there may be pressure to reduce grazing on clearcuts.
- Livestock can reduce vegetation that may compete with trees.
- Seeding domestic forage may enhance the ability of livestock to control vegetation competing with the tree crop, or may increase the level of competition.
- Some silviculture treatments make clearcuts unusable or increase the potential for cattle damage so the opportunity to graze some areas may be lost.
- Spacing and thinning increases forage production, but the debris created may make some areas inaccessible to livestock and wildlife. The carrying capacity of affected ranges may be decreased.

Management Strategies

- Develop Range Unit Plans to cover all range areas.
- Support the use of livestock, where appropriate, as a form of vegetation management.
- Seed areas of important range where harvesting disrupts grazing patterns, or where there is a need for quality forage.
- Time spacing and thinning of young stands so as to minimize the impact on cattle movement and maximize forage production.

7.4.3 Increased Demand for More Grazing Areas

Demand for spring and fall ranges has been strong and steady . This demand could be met by more intensive management. There may be an increase in authorized use in some areas to maintain flexibility and thus address reduced use in other areas due to other resource requirements.

Management Strategies

- Allocate funding for range activities to areas that will optimize the number of cattle in important range areas.
- Emphasis will be placed on effective planning, since demand is generally in lower elevation, more accessible areas, which often conflicts with other uses.

7.4.4 Loss of Natural Barriers

Removal of timber barriers between major watersheds has created a cattle control problem in many areas. Mixing of cattle on summer range results in cattle returning to the wrong wintering areas. The costs of retrieving cattle and the disruption to planned grazing systems are severe enough to keep ranchers from pushing cattle near the breached barriers. Large amounts of readily available forage are therefore not used.

Management Strategies

- Retain natural barriers for livestock control where possible. If this is not possible, apply policy which gives an appraisal allowance to the licensee for construction of remedial fencing.

7.4.5 Increased Urbanization

The major effect of increased subdivision development, including the buffer zone around new subdivisions, on range use will be a reduction in the area of range land.

Management Strategies

- Pursue more intensive range management in rural/urban interface areas.

7.4.6 Noxious Weeds

Noxious weed infestations, especially knapweed, have reduced the forage supply for livestock and wildlife. Knapweed is beyond the containment stage in the southern half of the TSA. The priority is to restrict its spread to the north and to other TSAs.

Houndstongue, dalmatian toadflax and sulfur cinquefoil are of more recent concern and are infesting increasingly large areas. If knapweed and other noxious weeds are not controlled, there will be a further reduction in the availability of spring and fall forage for livestock and wildlife.

Management Strategies

- Continue the spray program for knapweed to control its spread in mid and upper elevation ranges.
- Increase biological and chemical programs in lower elevation ranges to control the spread of knapweed.
- Address existing and expanding houndstongue infestations as part of the knapweed chemical and handpulling program where the two species occur together.
- Support inter-agency programs for noxious weed control.
- Introduce appropriate control measures to deal with newly discovered weed species.

7.4.7 Range-Watershed Interactions

In critical watersheds that produce water for human consumption, grazing and soil disturbance may cause an increase in coliform content in the water. An increased demand for range near developing communities could result in conflict between range and water uses.

Management Strategies

- Intensively manage livestock near water courses, particularly near domestic water sources. This will be specified in the tenure conditions and compliance will be monitored.
- Develop Range Management Plans in the more intensively used watersheds.
- Assess the need for fencing in community watersheds, where required, on a priority basis.

7.4.8 Range and Fish and Wildlife Habitat Interactions

Wildlife and range interests can co-exist if proper range management is undertaken. Overstocking, inadequate monitoring of range activities and inadequate cattle control can affect sensitive wildlife habitats and the amount of forage available to various species of wildlife. Sensitive habitats include riparian areas, subalpine habitats, winter ranges, dry grasslands and grizzly bear habitats. Dry grasslands are of particular concern as cattle overgrazing can severely alter natural vegetation, resulting in a complete change of the native vegetative community.

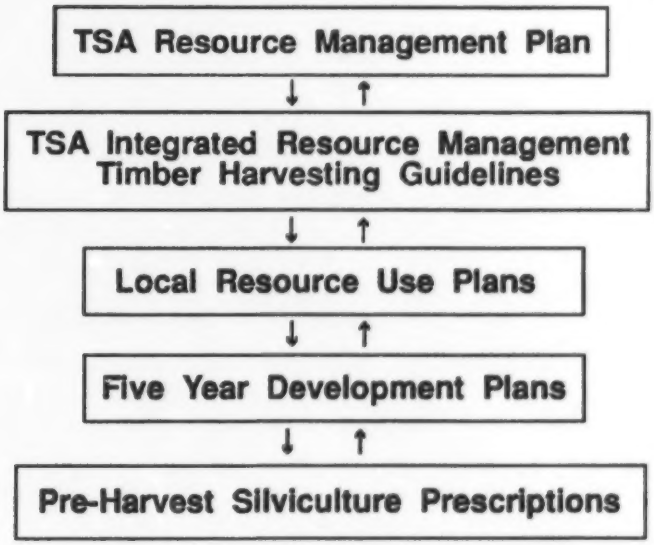
Management Strategies

- Continue to restrict cattle use of important winter range for wildlife.
- Increase monitoring of cattle to ensure compliance with grazing permits.
- Initiate Local Resource Use Plans on a priority basis, to deal with contentious cattle and wildlife issues.

8 Implementation

Implementation of this TSA Resource Management Plan is the responsibility of the three district managers, in conjunction with the regional manager. Implementation is directed through levels of the Forest Service planning framework as shown Figure 4:

Figure 4
Resource Management Planning


TSA Resource Management Plan
TSA Integrated Resource Management Timber Harvesting Guidelines
Local Resource Use Plans
Five Year Development Plans
Pre-Harvest Silviculture Prescriptions

8.1 Integrated Resource Management Timber Harvesting Guidelines

The Timber Harvesting Guidelines are a statement of expected standards aimed at ensuring that all forest harvest related activities conducted in the Okanagan TSA reflect the need to maintain the many resource values that exist or may be required in the future. To implement the Timber Harvesting Guidelines, the TSA has been divided into five resource management zones. Where zones overlap, the most stringent harvesting guidelines apply.

8.1.1 Basic Integrated Resource Management Guidelines for All Zones

These guidelines are the minimum standard of management practice throughout the TSA. In particular they represent the primary harvesting standards for the Timber Harvest Emphasis Zone (see 8.1.6). In the absence of more stringent requirements of a particular zone, these guidelines apply. There may be an increase in authorized use in some areas to maintain flexibility and thus address reduced use in other areas due to other resource requirements.

8.1.2 Community Watershed Zone

In the Community Watershed Zone, the main consideration is protection of the water resource. When conducted, timber management activities should provide for maintenance of water quality, quantity and timing of runoff. Compared to other watersheds, the rate of cut should be slower, and cutblocks should be smaller and narrower to maximize shading.

8.1.3 Ungulate Winter Range Zone (Deer, Sheep and Elk)

The dominant consideration in the Ungulate Winter Range Zone is maintenance of the winter range resource for deer, sheep and elk, including cover and forage. The intent is to maintain or enhance forage production by dispersing the harvest throughout the winter range and by spreading it out evenly over the rotation.

8.1.4 Lakeshore Zone

The Lakeshore Zone is the forested area within 200 m of the riparian area surrounding lakes. The 200 m area may be further extended where it is needed to maintain values on specific lakes.

The guidelines developed for each category of lake take into consideration factors such as degree of use, angler effort, productivity, recreational value, aesthetic value and hydrological importance.

Partial cutting methods such as selection and group selection are encouraged in most lakeshore zones. This will permit a long term yield of timber for harvesting, while maintaining some tall timber for shelter, aesthetics and wind protection.

8.1.5 Landscape Management Zone

The emphasis in this zone is to minimize the visual impact of harvesting along corridors where people live, work and travel. The zone is divided into four subzones according to on whether the visual quality objective of the natural landscape is for preservation, retention, partial retention or modification.

8.1.6 Timber Harvest Emphasis Zone

This zone includes all areas in which there are no major conflicts with community water, ungulate winter range, lakeshore management and landscape management. The emphasis in this zone is to ensure the long term optimum harvest of forest products while protecting basic resources. In this zone the Basic Integrated Resource Management Guidelines apply.

8.2 Local Resource Use Plans

For areas with issues that require additional standards or consideration, Local Resource Use Plans are prepared. These plans include an extensive public involvement process and set out guidelines, over and above the standard guidelines for specific areas, to manage for particular resource values. Some examples of these plans are:

- Penticton Creek Integrated Watershed Management Plan
- Upper Shuswap River Integrated Resource Management Plan
- Chute Lake Forest Management Plan
- Greystokes

8.3 Five Year Development Plans

Within the context of area specific management guidelines (i.e. Timber Harvesting Guidelines) and TSA Resource Management Plan strategies, five year development planning details the logistics for development. Included is District level planning by the timber, silviculture, range and recreation sections of the Forest Service and development planning by timber and range licensees. These plans specify locations, methods, schedules and management responsibilities for accessing, using, renewing and restocking the resource.

8.4 Pre-Harvest Silviculture Prescriptions

The Pre-Harvest Silviculture Prescription (PHSP) is a planning system at the operational level which involves collection of site specific field data and the development of forest management prescriptions for cutblocks before harvesting. The intent of the PHSP is to bring about, at the end of the logging process:

(i) conditions on the harvested area that will best preserve inherent site productivity and that will result in the establishment of a new forest best suited to the site; and

(ii) conditions that will protect or preserve the opportunity to manage for other natural resource values.

8.5 Resource Management Plan Review Process

To ensure that the assumptions and strategies outlined in the Okanagan TSA Resource Management Plan are both realistic and practical and to monitor performance of the strategies, a resource management plan review process will be initiated. This will take the form of a periodic forest monitoring report.

This report will:

(i) document performance on the management strategies;
(ii) list research activities that are related to specific strategies along with when results can be expected;
(iii) maintain a ledger of withdrawals from the forest land base;
(iv) discuss any new planning initiatives as they relate to strategies;
(v) reconcile the timber harvest volume cut with the inventory volume used for timber supply analysis;
(vi) provide update on current TSA resource management planning process.

Glossary

Allowable Annual Cut (AAC)
The rate of timber harvest from a specified area of land. The AAC for the Okanagan TSA is determined by the Chief Forester of the Province and is reviewed every five years.

Animal Unit Month (AUM)
The amount of forage required for one month by an average cow and calf, aged six months or older.

Biodiversity
The variety of living organisms in an area.

Biogeoclimatic Zones
A broad geographic unit that has the distinguishing characteristics of climate, soil and vegetation.

Community Watershed
A watershed on which a community holds a water licence and is the drainage area upstream of the licensed point of abstraction.

Equivalent Clearcut Area (ECA)
The amount of harvested forest land within a watershed which, hydrologically, acts like a clearcut.

Free-growing
Refers to a crop of healthy trees, the growth of which is not impeded by competition from plants, shrubs or other trees.

Height Class
An interval into which the range of tree heights is divided for classification and use.

Hydrologic Recovery
The point at which a second growth stand of timber will hydrologically resemble old growth (ie. in terms of timing and quantity of water yield.)

Integrated Resource Management
A process to identify, assess and compare all resource values as a basis for making decisions on resource use management.

Local Resource Use Plans (LRUP)
Local Resource Use Plans establish area-specific integrated resource management guidelines for areas where resource use development is proposed. It involves the resolution of multiple resource use conflicts and is both a response to development proposals and a prerequisite to development planning.

Mineral Claim
Rights to minerals under land where those minerals are reserved to the Crown may be obtained by locating a mineral claim. A mineral claim consists of 1 to 20 unit (s) of 25 ha each. The holder of a mineral claim may explore and develop the claim and may go into limited production, 1000t (metric) of ore annually. To go into full production, the mineral claim must be surveyed.

Not Satisfactorily Restocked (NSR)
Productive forest land that has been denuded and has failed partially or completely to regenerate naturally or to be artificially regenerated within a specified period of time.

Partial Retention
Refers to the visible evidence of harvesting in an area. Partial retention indicates that alterations will be visible but only up to 15% of the visible area, including any previously logged areas which do not yet appear green.

Pre-Harvest Silviculture Prescription (PHSP)
A planning system that develops forest management prescriptions for cutblocks in advance of logging.

Regeneration
The renewal of a forest crop by natural or artificial means. The new crop is generally less than one meter in height.

Riparian Zone
The wetted area adjacent to water bodies. It is important for wildlife habitat and water values.

Selection Silviculture System
An uneven aged management system where trees are periodically removed individually (single tree selection) or in small groups less than 0.1 ha. in size (group selection). Regeneration is continuous through natural seedfall or supplemented by under planting. Permanent forest cover is maintained.

Thermal Cover
Shelter used by animals to protect against the effect of weather.

Timber License
A forest tenure which defines a specific area within which the Licensee has been granted the right to harvest timber.

Timber Supply Area (TSA)
An area of the province created by the Minister of Forests for the purposes of analysis, planning and management of forest resources. Boundaries have been determined on the basis of the present and expected population centres, transportation networks, manufacturing facilities and existing administrative boundaries.

User Day
The time allotted to one person spending one day or a portion of a day in a specified area; usually a recreation area such as a park.

Watershed
The total natural upstream land drainage area above any point of reference on a stream.

Wildlife Corridor
A route followed by animals along a belt or band of suitable cover or habitat.